DOCUMENT RESUME

ED 099 220 95 SE 018 293

TITLE	A Multidisciplinary Process Curriculum in Environmental Education, Grade 5.
INSTITUTION	Edmonds School District 15, Lynnwood, Wash.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
PUB DATE	73
GRANT	OEG-0-72-5436
NOTE	144p.
EDRS PRICE	MF-$0.75 HC-$6.60 PLUS POSTAGE
DESCRIPTORS	*Conservation Education; *Curriculum Guides; *Elementary Education; *Environmental Education; Field Trips; Grade 5; Instructional Materials; Learning Activities; Natural Resources; Outdoor Education; *Science Education; Teaching Guides

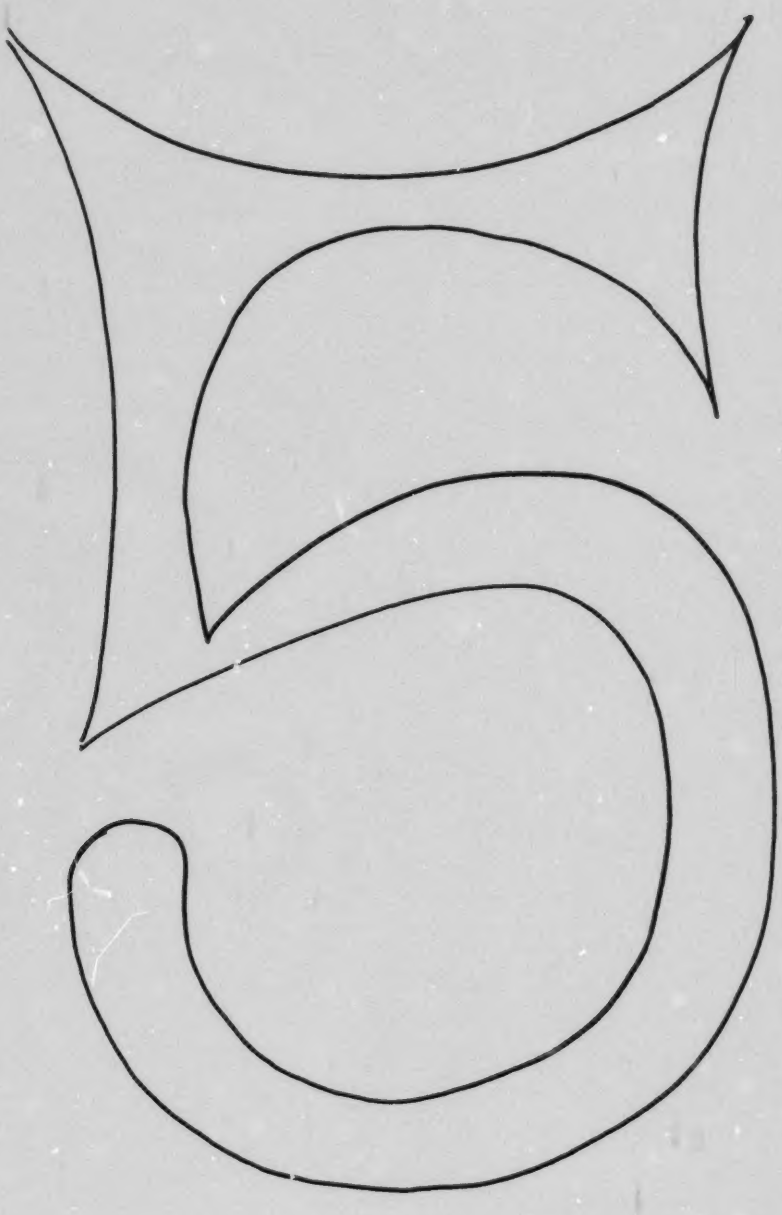
ABSTRACT

This environmental curriculum guide is designed for teacher use in the fifth grade. A collection of multidisciplinary activities, guidelines for conducting field trips, and a resource section are included. The activities are organized within three categories--awareness, man's use, and problem solving. They are designed to provide the student with opportunities to make observations, collect and record data, interpret the data, and summarize. The use of these activities, either individually or in sequence, aims to establish a climate of pupil participation, discussion, and interaction. Each activity is classified by topic, subject, completion time, and grade level. All activities include: objectives, a materials list, teacher background information, a preactivity, the activity, a post activity, and additional activities. Guidelines for conducting a field trip are included to facilitate the teacher in teaching her students in the out-of-doors. The guidelines cover pre-field trip, field trip, and post-field trip planning. The resource section lists speakers, films, free and inexpensive materials, pamphlets, and conservation and environmental groups which may be contacted for information about environmental topics. (TK)

ED 099220

U S DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

BEST COPY AVAILABLE



SE 018 493

ED 099220

A MULTIDISCIPLINARY PROCESS

CURRICULUM IN ENVIRONMENTAL EDUCATION

K - 12

Under Provision of Public Law 91-516, Grant No. OEG-0-72-5436

Project No. RO 21178

PROJECT WRITING TEAM

Elementary

Sue Brown
Larry Gidner
Carol Gissberg
Dan Griner
Patricia Medved
Mary Beth Peters
Lynn Severance
Rosanne Walker

Secondary

Steve Burger
Bill Hanlon
Les Kramer
Larry Luke
Lauretta Main
Rod McLeod
Jan Parsons

Staff Artists

Kathy Aukland
Kathy Hildahl

Project Director

Bill Hamilton

Edmonds School District No. 15
Snohomish County
Lynnwood, Washington

1973

PROJECT SUMMARY

This project was designed to provide a working model for the structure and implementation of a multidisciplinary process curriculum in environmental education, grades K-12. This model emphasizes the broadly based socio-ecological approach endorsed by the Edmonds School District Environmental Education Council, as a unifying theme to be incorporated into a comprehensive environmental program. Such an approach seeks to integrate the cultural, historical, and social aspects of man with fundamental sociological principles applicable to all living organisms. It will utilize the school and total community as a field laboratory and as a basis for the investigation of ecological relationships and environmental problems. The design of the model presented here includes five phases which have been sequentially organized into the following areas:

1. To plan for the structure of appropriate training and student activities as designed by two writing teams selected on the basis of defined qualifications. The participating teams represented each grade level, K-6, and each relevant secondary discipline, 7-12. The team consulted with community, local, state, and natural resource personnel and incorporated existing materials into a total program that reflects the objectives established.

2. A plan for implementing the materials written by means of training sessions at the elementary building level and for the specific secondary disciplines and secondary teachers involved. The writing team will form a nucleus for the training of teachers in use of materials and equipment.

3. A plan to evaluate the effectiveness of materials and methods used through formal and informal feedback from students and teachers involved. Students will be evaluated on the cognitive aspects of the curriculum materials written and both teachers and students on the attitudinal aspects.

4. A plan for revision and retraining as necessitated by the analysis of evaluation procedures and results, and from community feedback.

5. A plan to continue the program utilizing district and community funds under the guidance of the Edmonds District No. 15 Environmental Council in cooperation with the District Environmental Consultant.

This project is a "beginning". It was written during four weeks of the summer of 1973. The writing team realizes that they have just scratched the surface of putting together a K-12 multidisciplinary environmental education curriculum. We know that it needs to be tried by teachers, and hope that you will use it while instructing your students. Try it out! Write in it and jot down your notes. Revise, add and delete! Then give us feedback as to how you used it and how you felt about the whole thing so that we can work your ideas into our revision next summer. There are extra lesson outlines in the back to experiment with. Now -- enjoy!

Grades 3, 4, 5 and 6

INTRODUCTION

This is a series of lessons which are still in rough draft form. We would encourage you to use, refine, revise, delete and add to these lessons. They are only as good as your ideas make them. To be of greatest value, the lessons should undergo continuous revisions for improvement. Please use the open spaces on the lesson plans, and the forms at the end of this section, to make your own notes and lessons. Many minds are better than few!

We have attempted to provide opportunities for the student to make observations, collect and record data, make some interpretations of the data, and summarize. The activities were designed to emphasize this process, thus developing the ability of each student to think for himself. The use of a certain question sequence facilitates this thinking process. It can establish a learning climate which will foster pupil participation, discussion and interaction. It can allow students to interpret their own observations and record data. In recognition of the high quality Environmental Education materials previously published by Edmonds School District #15 and surrounding school districts, it was decided to concentrate our efforts on activities and processes which seemed to be new material.

Many lessons include task cards for student use. The advantages of a task card over a work sheet are: 1) They are more manageable for use in the field; 2) Students are more free to collect their own data, since directions are kept simple and open-ended, and are printed on the card; 3) The task seems attainable at the outset, and students are able to experience a sense of completion and success at the end; 4) By having only one task card per group, fewer records need be kept by the children and the adult in charge.

Litter Lessons are identified by the torn paper design in the upper right-hand corner of the page. They will appear this way throughout the various grade levels of three through six.

The entire litter section of the curriculum project was funded by the State of Washington Department of Ecology, and drawn up by the Federal Project Environmental Education Writing Team during the summer of 1973. The litter sections are a part of the overall Environmental Education Federal Project. It is hoped that it will provide additional environmental awareness among children at the elementary level.

ACADEMIES

TOPIC: Animals
SUBJECTS: Science
EST. TIME: 30 minutes
GRADE: 5

AW

ANIMAL COLORATION

ACTIVITY (10 minutes)

Dim room lighting. Put students in rear of room. All students should be in back or those on side will see fish.

Expose the shadow box containing the two fish for one second. Ask: What did you see?

Remove screen. Let students see camouflage and compare the two fish. What are the chances of survival of the two fish? What hypothesis does this demonstration seem to support?

POST-ACTIVITY (20 minutes)

Have students work in groups to make shadow boxes of their own. Their backgrounds can vary. They will need the materials listed. They should construct the fish so that one will stand out and one will be camouflaged. They can be kept simple with one color for the background, if desired.

Then students can hold their own peep shows.

LEVEL V OBJECTIVE

Students will understand adaptations of animals.

LEVEL VI OBJECTIVE

Student will know the importance of camouflage as an adaptation for survival.

Materials

MATERIALS

Construction paper, 24" x 36" medium brown, 12" x 18" medium brown, 12" x 18" black; scraps of white, dark brown, black and medium brown; 2 white reinforcement rings; masking tape; 2 cardboard cartons; approximately 1' x 1' x 1-1/2'; 24" x 36" cardboard or chipboard; wire coat hanger; scissors; cutting pliers; duplicating materials and equipment.

TEACHER BACKGROUND INFORMATION

Using directions attached, teachers should set up shadow box, ahead of time.

Instructions for Construction of Peep Show

Paper Fish - The two fish used in the peep show may be made with pattern B, Plate 1. Both fish should be made of medium brown construction paper. By folding the construction paper before cutting, the two fish may be cut out simultaneously. One will eventually be patterned, as described later.

To increase the life of the tabs, reinforce them with masking tape before cutting the slots. Cover the hinge portion of the tab. Trim off excess tape.

Be sure that none of the students observe the preparation of the fish as foreknowledge of the nature of the objects in the peep show will spoil the fun.

Fish's Eyes - Eyes for the fish can be fashioned from gummed reinforcement rings and scraps of black construction paper. Cut or tear a piece of the black paper slightly larger than the size of the hole in the ring. Paste it on the fish at the location of the pupil and glue on the reinforcement ring over it in such a way that the black fills the hole of the ring. A black crayon or felt pen can also be used to blacken the area to be covered by the ring.

Shadow Box - The peep show makes use of a "shadow box," an opened-out box in which models of fish can be set up for viewing under conditions of overhead lighting. The primary use of the shadow box is in the student's experimentation with countershading; however, the same device also works well for the peep show.

The shadow box may be made from a cardboard carton about 1-1/2 feet in length and 1 foot in width and depth. Remove the top and one end of the carton and slit along the two vertical edges of the other end as shown in Figure 12.

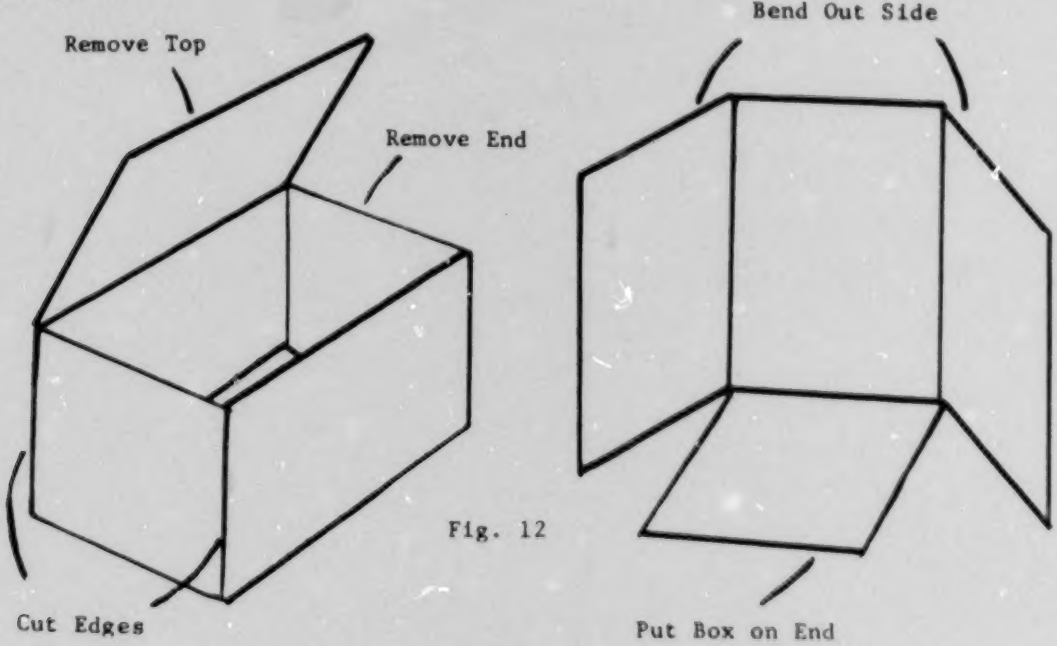


Fig. 12

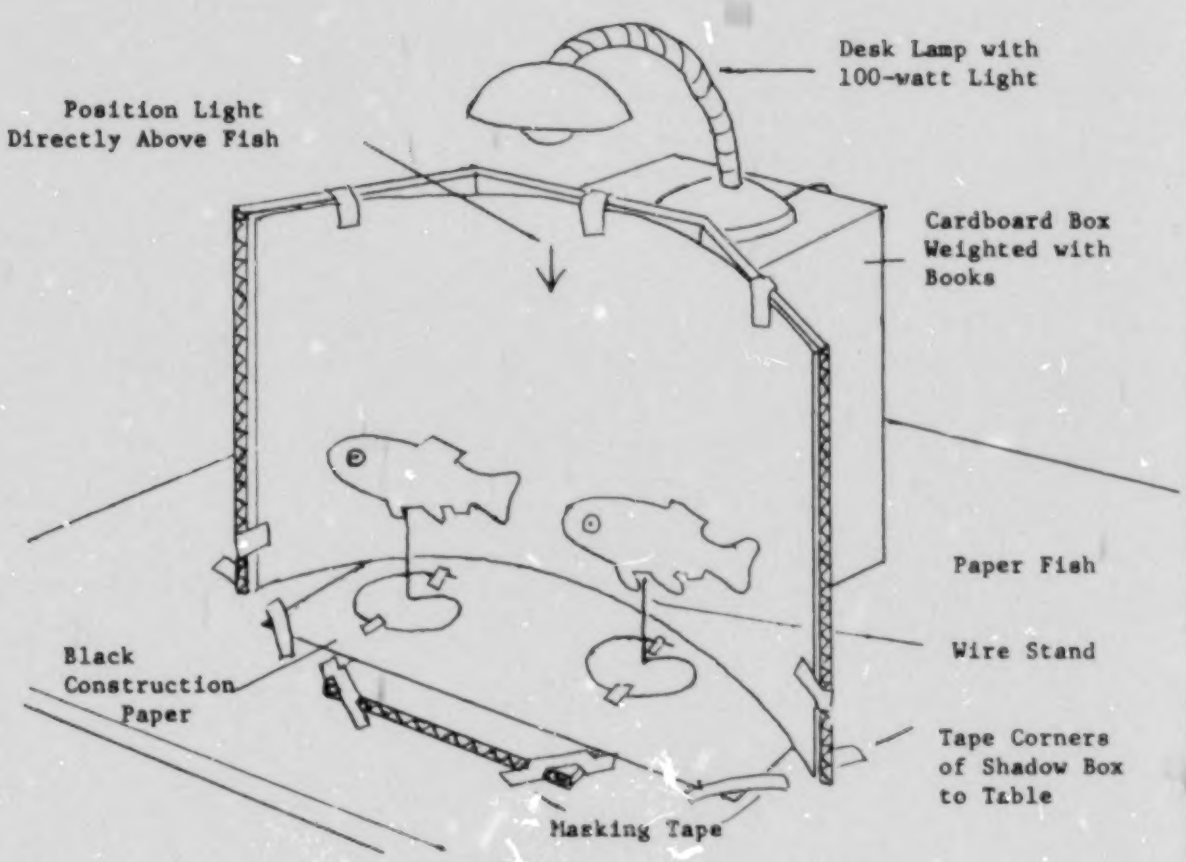


Fig. 13 Shadow Box Construction

The back (the original bottom of the box) and sides may now be covered on the inside with a curved sheet of construction paper to represent the habitat of the fish. (Color and pattern of the habitat are described in the next section.)

The bottom of the shadow box (the original end of the box) should be covered with black construction paper to reduce the reflection of light.

After the black construction paper is in place, stands for the fish may be installed as shown in Figure 13. Each box should be equipped with two stands, one to support each of the fish. Wire from a coat hanger may be used for the stands. The stands should be made as shown in Figure 14. Wire cutting pliers of any sort are adequate for the job. To hold the stands in place, tape them as shown.

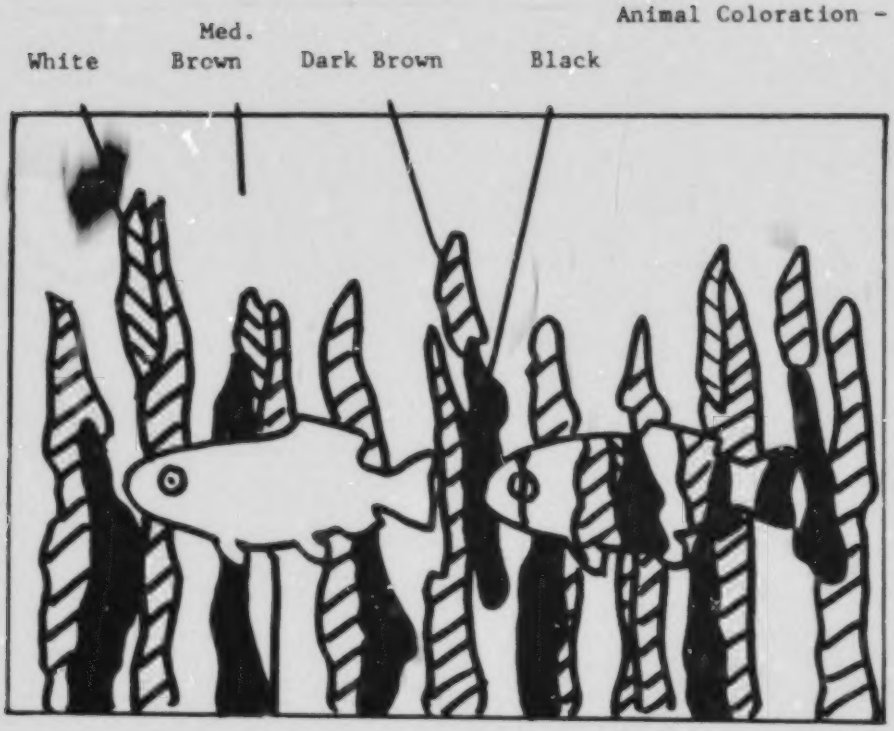


Fig. 15 HABITAT AND MODELS FOR PEEP SHOW

The shadow box requires lighting from above. An effective way to provide such lighting is by use of a lamp such as a gooseneck desk lamp placed on a cardboard carton behind the shadow box, as in Figure 13. A 100-watt light should be positioned above the fish at a distance of 1-1/2 to 2 feet.

The shadow box must be equipped with a drape or screen which can be lifted and dropped to expose and then conceal the fish quickly. A large sheet of cardboard works well.

Pattern for fish and Habitat - For best effect, the shadow box habitat and the camouflaged fish used in the peep show should both be patterned, and the uncamouflaged fish should be plain, as in Figure 15.

Fig. 14 CONSTRUCTION OF STAND

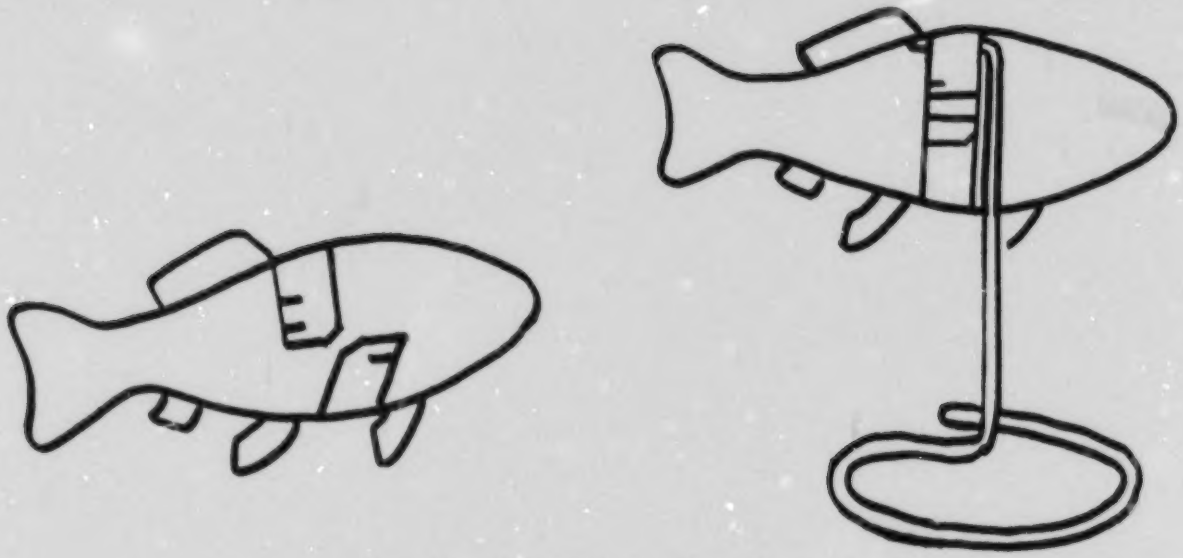


Fig. 16 MOUNTING THE FISH (Back Views)

The patterning for the background of the shadow box and for the camouflaged fish may be made most easily by tearing strips of construction paper and pasting them to box and fish. Be sure that a black stripe passes through the pupil of the camouflaged fish but does not cover the entire eye.

Mounting the Fish - To mount the two fish in the shadow box, the tabs must be folded and interlocked as shown in Figure 16. Use of the outermost slot on the upper tab will give a flat fish. (The other slot gives a rounded fish for use in the countershading experiments. Its use here is not recommended.)

Timing - Some prior experimentation is probably advisable to determine optimum lighting and exposure time for the peep show. A more dramatic effect is achieved if the room is darkened except for the shadow-box light. Up to two seconds exposure has been used successfully; lighting, room arrangement, and skill in camouflaging all influence time selection.

Preparation for Future Lessons - At the close of the present lesson, you may wish to select one or more committees to make shadow boxes for future use.

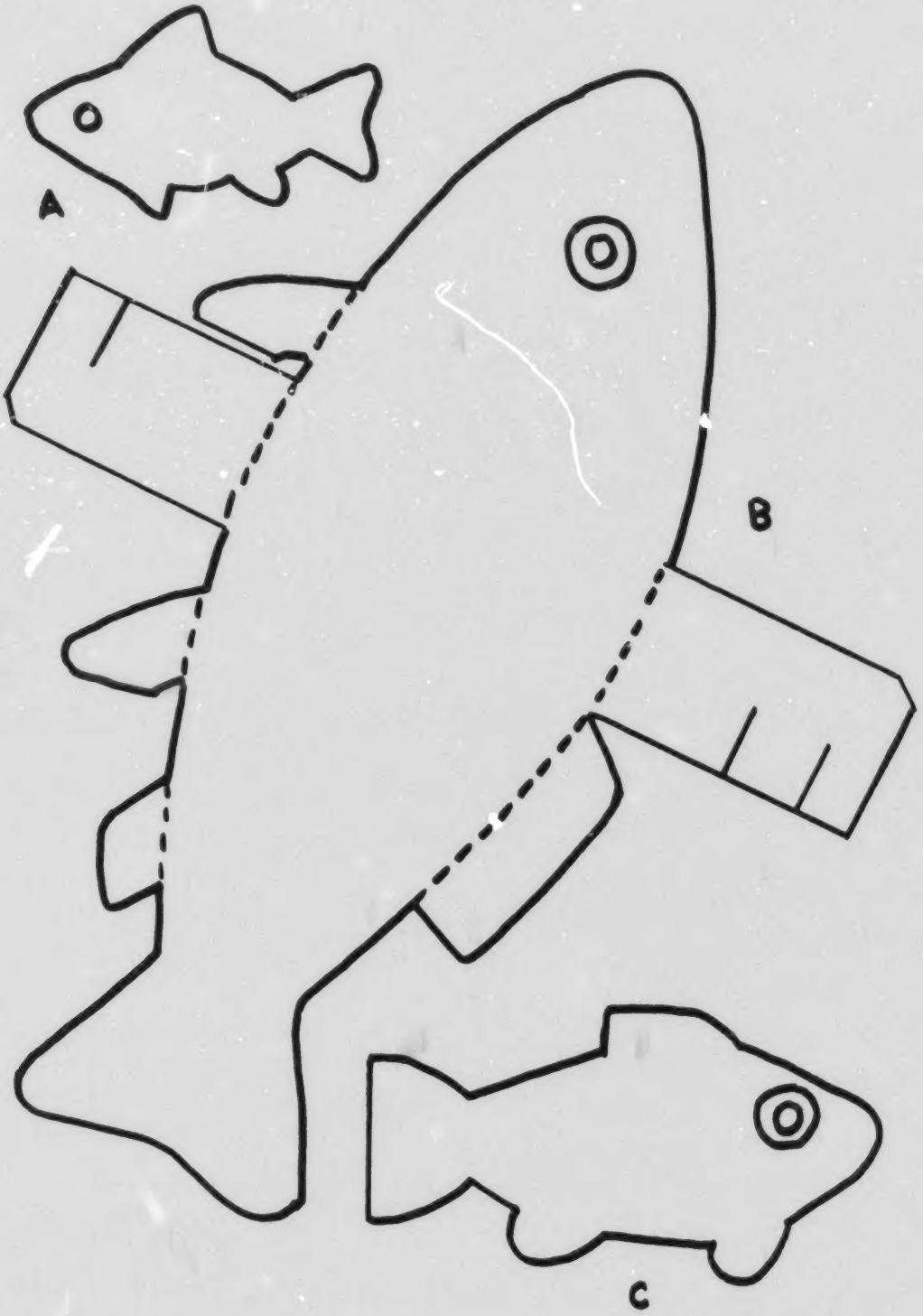


Plate 1

TOPIC: Animals
SUBJECTS: Science
EST. TIME: 30 minutes
GRADE: 5

AW

ANIMAL STUDY

PRE-ACTIVITY (5 minutes)

A day or two before the first lesson, select several students to bring in living animals for the class to see - frogs, lizards, caterpillars, moths, butterflies, salamanders, etc. No domestic animals, since their colors have often lost their original function. If the students can't find live animals, use large pictures.

Discuss coloration of animals. Discuss what a hypothesis is. Discuss what concealment is for animals.

ACTIVITY (20 minutes +)

Select one animal or picture of animal to pass around for each student to handle or at least inspect closely. Other animals or pictures can be on display. After observation of animals, have students list ways they think that coloration of an animal might help it to live (individual hypothesis). This is their own list and they shouldn't discuss it with their neighbors. Later on they can look back at these first ideas and compare them with what they think at the end of the study. Discussion: Ask several students to give one item on their list. Put these on board. Concealment will surely come up. Discuss it briefly. Someone may hit on various aspects of advertisement. If not, the discussion may be stimulated by asking: Why are some wasps and butterflies so gaily colored? Probably isn't good to go into the many ways in which advertisement may serve an animal at this time. Discuss all items brought up. Then have students copy the hypotheses off board as "Class Hypotheses." The "Class Hypotheses" should not be presented as complete.

POST-ACTIVITY (5 minutes)

Make a notebook for students to keep materials. They can decorate as they wish.

LEVEL V OBJECTIVE

Atudents will understand adaptations of animals.

LEVEL VI OBJECTIVE

The student will know the importance of coloration as an adaptation for survival.

MATERIALS

Materials

Animals such as frogs, lizards, turtles, that students may have or pictures of these animals (no domestic animals); gallon jars or containers for animals; cover for jar with air holes.

TEACHER BACKGROUND INFORMATION

An obvious function of color is concealment. A brown moth on a brown tree is safer from a passing bird than a white moth. Concealing colors may serve an animal in two different roles, as prey and as predator. With such animals their habits may make concealment vital for both protection and predation.

Another possible function of color is for advertisement. An example is the bright blue tail of the western skink, a small lizard found in North America. The tail makes it very conspicuous. This serves as an advertisement that may divert attack from vulnerable parts of its body to the expendable tail which can be shed and regrown. The young cottonmouth uses its tail as bait. The primary purpose of this first lesson is to suggest that any question about animal coloration may have an answer - perhaps even an answer that they themselves can discover.

RESOURCES

Animal Colouration - Printed by the Department of Production, Technical Correspondence School, Robert C. Stebbins, Museum of Vertebrate Zoology, University of California, Berkeley, California.

TOPIC: Micro Ecology
SUBJECTS: Science, Math
EST. TIME: 65 minutes
GRADE: 5

AW

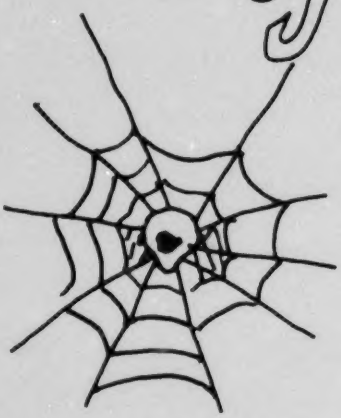
PRE-ACTIVITY (15 minutes)

Discuss meaning of microecology (relationships between living things and their environment when the environment is limited to an area approximately 3 feet square and 6 feet high). Introduce the equipment to be used and the procedures for field work. Put students into teams of two or three and all records are prepared as a team.

MICRO ECOLOGY

ACTIVITY (30 minutes)

Activity



Choose area for study. Find area with a variety of specimens. Use the four stakes and string to stake off study area. At 1/2 hour intervals use the temperature stake to record the temperature at four different altitudes in your plot. This data can be plotted in the classroom. At 1/2 hour invervals use the wind stake to record wind direction at four different altitudes within your plot. This is also charted. Sketch a map of your plot including all the significant items within the boundaries. Include a key to identify symbols used on the map. Make a census showing evidence of animal life in plot. Those animals you actually see as well as evidence of other animals that use the plot temporarily, such as mouse runs, spider webs, animal droppings, etc. Things like feathers, bones, broken bird eggs, etc. can be packed and taken to the classroom. Record a census of plants within the plot. This should include a count of individual as well as varieties and tell whether the plant is alive, dead, or dormant (can use plant I.D. books or library to help name plants and animals but naming should not be as important as establishing the relationships and inter-dependence of living things.). Examine soil. Could do a micromonolith to compare color, compactness, texture (go about 4 to 6 inches deep). Take the pH of the soil using soil kit. Take pH at three different depths, the first being the surface.

POST-ACTIVITY (20 minutes)

While discussing the wind chart and the temperature chart, questions about the causes of wind could lead the students to some practical library experience fulfilling a need for information. Were all the wind vanes turned in the same direction? Why or why not? (Students can share their plot information.) Were there changes in temperatures? Causes of these changes? Was there any correlation or relationship between the temperature and wind direction? Was there a difference of pH at the three depths? If so, what are some reasons for this? Predict some other plants that you think could live in your soil plot. Check your predictions from books in library or take pH test under plants you predicted could live there that you may find at home or around your school. What would happen to your animal population if the pH was drastically changed? (Plant types may change and then in turn animals may leave the area and new animals may come to area, because of plant changes. Discuss possible reasons for this.) What physical characteristics besides pH effect the plants and soil? Do the animals find food, shelter, or what in these plots? Is there any competition between plants and animals in the plot?

SUGGESTED ADDITIONAL ACTIVITIES

Have your students explain their findings to a K-2 student and show them their plot on a one to one basis. Come back in a month and check your plot again.

LEVEL V OBJECTIVE

1. Students will understand relationships between different species.

2. Students will comprehend relationships among all organisms and their non-living environment.

LEVEL VI OBJECTIVE

The student will be able to identify the living and non-living factors in a local environment.

ng
er-

The student will be able to explain relationships among the living and non-living factors in a local environment.

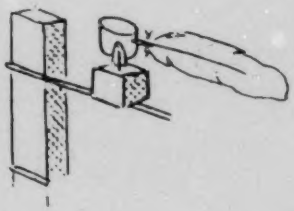
Materials

MATERIALS

Four corner stakes (pencils or pop sickle sticks, etc.); 12 feet of string to string around corner stakes; feather vane; 2 thermometers; magnifiers; drawing paper; colored pencils; note paper; small directional compass; small glass or plastic containers for packing in any samples found. In addition, the teacher should have the following available: One temperature stake per two teams (six foot furring strip from lumberyard); one wind stake per four teams (six foot furring strip with slits sawed at four levels to hold hacksaw blade supports for wind vanes).

TEACHER BACKGROUND INFORMATION

Feather vane for wind stake is made from one large feather glued to a lightweight base, one large needle, a one-inch piece of glass tubing (closed at one end), one support made of a wooden block, and a broken hacksaw blade. It should be constructed to look like the picture at right.



RESOURCES

"Science and Children", Vol. 10 Number 6, March 1973. "Microecology", by Janice J. Withington.

TOPIC: Plot Study
SUBJECTS: Social Studies, Science
EST. TIME: Begin in the Fall
GRADE: 5

AW

SIX BY SIX

Activity

PRE-ACTIVITY (25 minutes)

Scout area of school property to find two similar, suitable area. Discuss types of data you want to collect and how often you want to collect (once a wk. to begin with and adjust more or less). Also demonstrate how to use equipment. Divide class so 6 or so people are on a team and have 4 teams, one for each area.

ACTIVITY (40 minutes)

Go to site and rope off 2 areas that are not to be used by anyone. Inventory all 4 areas as follows: 1) Plants; 2) Animals; 3) pH of soil; 4) Temperature of soil; 5) Perk test results; 6) Slope of area.

POST-ACTIVITY (20 minutes)

Is the data at the beginning the same between one sealed area and one non-sealed area? If so, which parts? What are similarities and differences of physical features of used and unused areas? Are any features changing as the seasons and weather change? Does the water availability change? Why or why not? Through the year, has the pH changed - if so, has the plant size changed? Has the animal life changed? What correlation or interrelationships are there between these factors?

SUGGESTED ADDITIONAL ACTIVITIES

Make a display of results on an all school bulletin board for all students to observe. Take pictures of the activites during stages or seasons and compile a book to be given to the library for future use.

LEVEL VI OBJECTIVE

The student will know that man can have an adverse effect on plant and animal populations in a given local area.

TEACHER BACKGROUND INFORMATION

Check with principal and possibly custodian to see where an area could be used and if chicken wire or rope should be used in sealing off the area. Sign reading "Stay Out" explaining a study is going on may be necessary (see Micro-ecology lesson).

LEVEL V OBJECTIVE

1. Students will understand relationships between different species.
2. Students will comprehend relationships among all organisms and their non-living environments.

MATERIALS

Four areas on school grounds that are similar, but two areas need to be roped off and not used by anyone - size of area could be 6' x 6'; soil kits; note paper and pencil for recording data; hand lens; soil thermometers; plant identification and animal identification books (optional); 3 cans (orange juice or soup) for perk test; rope or chicken wire.

AWARENESS

SURVIVAL

TOPIC: Survival
SUBJECT: Health
EST. TIME: 50 minutes
GRADE: 5 or 6

COVER UP

Activity

PRE-ACTIVITY (5 minutes)

Explain directions. Put partners into bags. Give boundaries of area.

ACTIVITY (25 minutes)

Tell students to go to pre-described area with one garbage bag per two students. Each student takes a library book and one person in total group needs a watch. NO COATS. One student puts on bag. Both sit down and read for 10 minutes. Then switch garbage bag to other person for another 10 minutes. Them come in and get questions to answer from the teacher.

POST-ACTIVITY (20 minutes)

Come in and answer questions, and discuss the answers.

SUGGESTED ADDITIONAL ACTIVITIES

Cover head (but not face) and see what difference there is.

LEVEL V OBJECTIVE

The student will perceive himself as a part of nature and will recognize his dependency on nature.

LEVEL VI OBJECTIVE

The student will know the effect of a plastic wrap upon body temperature.

MATERIALS

Enough plastic garbage can size bags for 1/2 of the class. Library books for each student.

Materials

SURVIVAL QUESTIONS FOR AFTER USING THE PLASTIC BAGS

1. How did you feel without the plastic bag?

2. How did you feel with the plastic bag?

3. How did the fact that you were sitting down effect your temperature?

4. Was there a wind? Would the wind affect the temperature?

5. What relationship is there between the bag and the warm temperature?

TOPIC: Survival
SUBJECTS: Health
EST. TIME: 30 minutes
GRADE: 5 or 6

THE NAKED TRUTH

PRE-ACTIVITY (5 minutes)

Discuss why we use 100° F. for water in cans. Predict what will happen to the temperature after 3 hours in each can. Predict which can will stay the warmest and which can will become the coldest.

ACTIVITY (15 minutes)

Upon setting up cans, have students record the temperature of each can. Cover openings with lid or some other way. Then, to simulate rain, pour water over 5 cans periodically. (The ones in plastic should not get wet.)

After 2 to 4 hours, have students take temperatures of cans again.

POST-ACTIVITY (10 minutes)

1. What was the beginning temperature of each can?
2. How did each can's temperature change?
3. Which can remained the warmest?
4. Which can became the coldest?

LEVEL V OBJECTIVE

The student will perceive himself as a part of nature and recognize his dependency on nature.

LEVEL VI OBJECTIVE

The student will know that materials such as wool and cotton affect the rate of temperature loss.

MATERIALS

5 gallon paint thinner cans or duplicating fluid cans with lids. Dress each can: two with wool, two in cotton, one left naked. Thermometer.

TEACHER BACKGROUND INFORMATION

Fill each can with water heated to 100° F. to simulate body temperature. Cover one of the cans with cotton and one of the cans with wool, with a sheet of plastic to simulate a raincoat.

RESOURCES

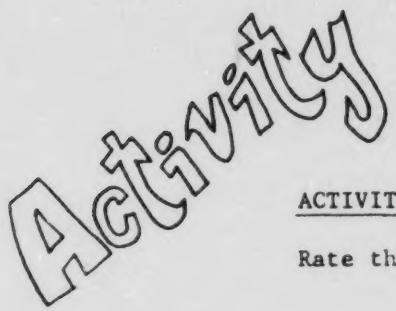
Gene Fear

TOPIC: Survival
SUBJECT: Health
EST. TIME: 25 minutes
GRADE: 5 or 6

SURVIVAL LEAD-UP

PRE-ACTIVITY (5 minutes)

Give directions and explain the problem and that you want them to rate the items.



ACTIVITY (10 minutes)

Rate the items.

POST-ACTIVITY (10 minutes)

Discuss or chart ratings by students, and reasons for their priorities. Save ratings for later.

LEVEL V OBJECTIVE

The student will perceive himself as a part of nature and recognize his dependency on nature.

LEVEL VI OBJECTIVE

Given a certain list of items and a hypothetical situation, the student will be able to list the order of importance of the items for survival.

MATERIALS

Problem statement and list of 15 items. Create the list of 15 items.

TEACHER BACKGROUND INFORMATION

With no explanation of the importance of the 15 items, have students read problem and rate the 15 items according to their importance: one is the most important, 15 the least important.

Either record whole class ratings on one chart or save each student's rating for future comparison.

RESOURCES

Gene Fear

TOPIC: Survival Wick Test
SUBJECT: Lang. Arts
EST. TIME: 55 minutes
GRADE: 5 and 6

WICK TEST

PRE-ACTIVITY (15 minutes)

Discuss the following:

1. What types of clothing did you take and wear on your last hike? List on board.

2. If you've never hiked, what kind would you take? Put in groups of 3 or 4 and have students choose a wardrobe from the list on the board that they feel would be the best one for their hiker. Pretend on the hike that the weather is nice to begin with, but it may cloud over and rain. You will be gone for 8 hours, barring unforeseen problems. If there is a piece of clothing that isn't on the board, they may use it, but must also add it to the board list. Leave this list up.

Activity

ACTIVITY (20 minutes)

Each group presents their hiker's wardrobe. Have more than one member present. Also, each group must state a reason for choosing each article of clothing they choose. Then have the class observe the pop bottles and explain verbally what they see.

POST-ACTIVITY (15 - 20 minutes)

1. How many groups dressed their hiker in wool?
2. Why are wool socks better than cotton socks?
3. Are there any items that any group wants crossed off the board now?
4. Revise your group's list to include some clothing, if not already done and turn in to the teacher.

SUGGESTED ADDITIONAL ACTIVITIES

Have students bring in other materials, polyesters, doubleknits, etc., and predict their wicking time, and then experiment as above.

LEVEL V OBJECTIVE

Student will perceive himself as a part of nature and will desire to live in harmony (dynamic balance) with the rest of nature.

LEVEL VI OBJECTIVE

The student will understand the wicking effect of water on various types of material such as wool or cotton.

Materials

MATERIALS

As many bottles as pieces of clothing you use (usually three). One piece of wool, one piece of cotton, one piece of denim (jeans). Could use cords or other material, but must have wool. One flat cake pan.

TEACHER BACKGROUND INFORMATION

While students are in groups doing the pre-activity, you can set up the pop bottles. Fill pan with 1" to 2" of water. Fasten pieces of clothing to bottles, so bottle is covered top to bottom. Place bottles in pan. In 15 minutes or so, the water will creep up (or wick up) to the top of the bottle wetting all the material. This will not happen to wool as it does not suck up the water. The wool will only wet up to the water level in the pan. Thus, wool is a great material for hikers.

RESOURCES

Gene Fear

TOPIC: Appropriate Dress
SUBJECTS: Health, Soc. Studies
EST. TIME: 55 minutes
GRADE: 5 or 6

KEEP YOUR COOL

PRE-ACTIVITY (15 minutes)

1. What types of clothing did you see on the way to school this morning?
2. What did you notice about the weather conditions today?
3. What can we say about the clothing based on the weather conditions?
4. How can we summarize our observations and discussions on weather and clothing?

ACTIVITY (20 minutes)

Break into six groups. Pass out six weather conditions. Give following directions: Each group has one weather condition; each group must decide on clothing necessary for work in their weather condition; each group must assign certain people to bring a piece of clothing for demonstration modeling; each group must choose a narrator and a person to model the clothing.

POST-ACTIVITY (20 minutes)

Each group's narrator and model will present their clothing (2-3 minute limit); at end of each presentation, rest of class will try and guess weather conditions portrayed.

Following all presentations and guesses, evaluate and discuss which clothing would be best for a school site investigation such as a stream study, pond study, nature walk, etc.

SUGGESTED ADDITIONAL ACTIVITIES

Instead of modeling, could have students draw a picture of proper clothing.

LEVEL V OBJECTIVE

1. Students will understand adaptations of plants and animals.

2. Student will perceive himself as a part of nature and will desire to live in harmony (dynamic balance) with the rest of nature.

LEVEL VI OBJECTIVE

The student will know appropriate clothing for survival under various weather conditions.

Materials

MATERIALS

Weather conditions sheet.

TEACHER BACKGROUND INFORMATION

Before going outside for an activity, be sure to go through the following activities. The success of outings can be determined by the comfort of your students.

Have students number off by six, then have all the ones meet in an area, etc., for the activity part of the lesson.

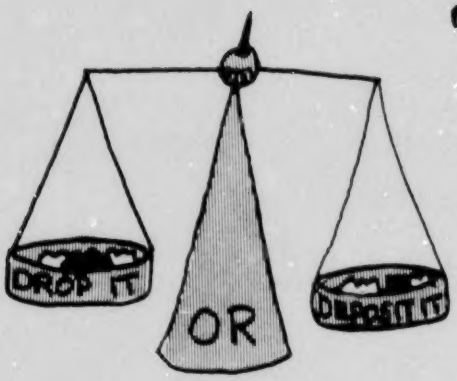
LITTER

TOPIC: Litter
SUBJECTS: Health, Soc. Studies
EST. TIME: 45 minutes
GRADE: 5

PRE-ACTIVITY (3-5 minutes)

Read a story or show pictures of litter to help motivate lessons.

LITTER "THRU THE LOOKING GLASS"



DO UNTO OTHERS, AS YOU WOULD WANT OTHERS TO DO UNTO YOU

ACTIVITY (20 minutes)

See worksheet

Activity

POST-ACTIVITY (10 minutes)

Evaluate progress at end of the week of Action Plan. After time lapse, review to see if attitudes, etc., are being retained.

LEVEL V OBJECTIVE

The student will feel a personal responsibility and will accept his responsibility to effect change in litter pollution.

LEVEL VI OBJECTIVE

The student will know that his or her action can effect resource utilization.

Materials

MATERIALS

Ditto sheet including Inventory Discussion and Action Plan; pencils or pens, one per student; a story or picture of litter to motivate students.

TEACHER BACKGROUND INFORMATION

You will need to ditto enough copies for your class of the following: Inventory Discussion, Plan of Action.

On personal inventory sheet, direct the students to circle or underline correct choice and fill in the blank.

TOPIC: Mini Environment
SUBJECT: Science
EST. TIME: 55 minutes
GRADE: 5

LITTER AQUARIUM

PRE-ACTIVITY (25 minutes)

Discuss components of aquarium. Construct aquarium.

Activity

ACTIVITY (20 minutes)

Plan recording device for what aquarium looks like now. Plan device for recording daily change seen in the aquarium.

POST-ACTIVITY (10 minutes)

After a complete week, discuss observation and data recorded.

SUGGESTED ADDITIONAL ACTIVITIES

Set up two aquariums, one with litter and one without litter. Then compare the two.

LEVEL V OBJECTIVE

Student will understand the effects of litter.

LEVEL VI OBJECTIVE

The student will know that litter has an effect on the life in an aquarium.

Materials

MATERIALS

Aquarium or wide mouth gallon jar. You could use gallon jars, one per four students, or the aquarium for the whole class. Fish and plants should be collected.

TOPIC: Litter
SUBJECTS: Creative Dramatics
EST. TIME:
GRADE: 5

COMMERCIALS ON LITTER Activity

PRE-ACTIVITY

Discuss why companies make commercials for their products. What age level will you try to convince?

Discuss some commercials they have seen.

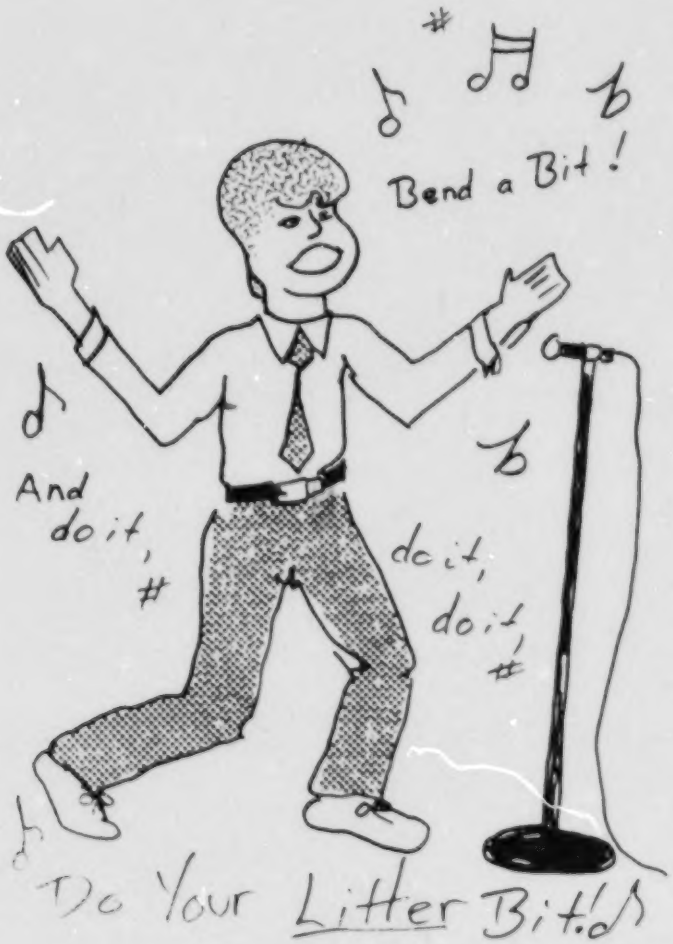
Discuss litter commercials they have seen.

Discuss what about a commercial sells it.

How many people do your commercials have to reach to change community attitudes?

ACTIVITY

Choose a litter idea and make up a commercial using any medium the student chooses, to be presented to the class.



POST-ACTIVITY

Evaluate commercials by asking students which commercial they were swayed by.

Discuss how commercials are a form of propaganda.

SUGGESTED ADDITIONAL ACTIVITIES

If using V.T.R., show commercials to other classes or to small students.

Compare commercials with newspaper and magazine articles.

LEVEL V OBJECTIVE

Students shall recognize litter as a pollution problem.

LEVEL VI OBJECTIVE

The student will be able to create a skit-advertisement-pantomime, concerning litter control.

Materials

MATERIALS

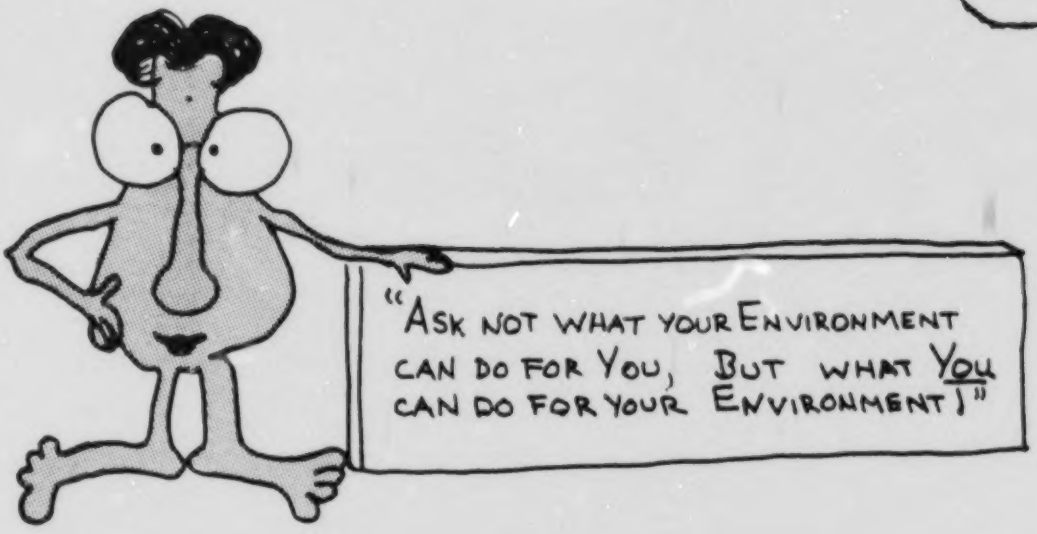
Tape recorder; overheads; V.T.R.

TEACHER BACKGROUND INFORMATION

Create a commercial for some aspect of litter. Use any medium you choose, and present it to the class.

TOPIC: Litter
SUBJECTS: Art, Soc. Studies,
EST. TIME: 40 minutes
GRADE: 5

"THE EYES HAVE IT"



ACTIVITY (30 minutes)

To cut down on eye pollution, make some place in the room more beautiful. Or make some place around your school more beautiful.

POST-ACTIVITY (10 minutes)

Discuss: Is it possible that in making a place more beautiful for yourself, you could have made it less beautiful for others?

SUGGESTED ADDITIONAL ACTIVITIES

Go into the community and make some place more beautiful.

LEVEL V OBJECTIVE

The student will know means of affecting change to environmental problems.

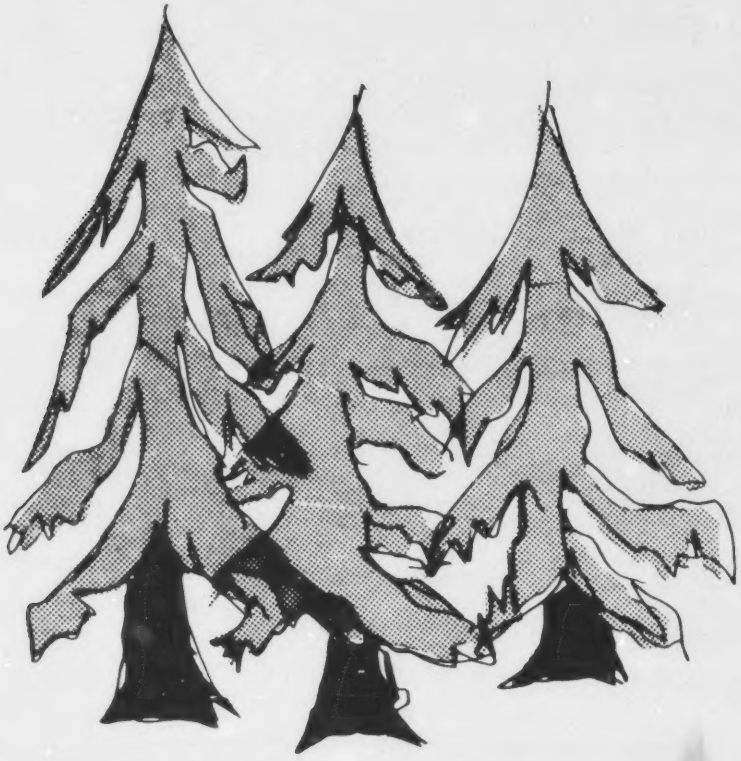
LEVEL VI OBJECTIVE

The student will recognize that pollution can be reduced by his efforts.

Materials

MATERIALS

Depends on project taken on.



TEACHER BACKGROUND INFORMATION

If around school, be sure to get appropriate permission.

ACTION PLAN ONE

(Data Sheet)

List of Things Thrown Away for the Week

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY

List the 5 things you selected to recycle and tell how you recycled them.

1.

2.

3.

4.

5.

PERSONAL LITTER INVENTORY

1. I (usually, sometimes, almost never) pick up litter because _____

2. I would (usually, sometimes, almost never) pick up litter if I were told to because _____

3. As driving down the freeway, I have (often wanted to, sometimes wanted to, never wanted to) stop and pick up litter.

4. I (usually, sometimes, almost never) am disturbed by seeing litter because _____

5. I would (usually, sometimes, almost never) pick up litter if _____

DISCUSSION

Jot down any ideas you have about the topics for discussion

Littering is easy, clean-up is hard.
Littering shows a lack of concern about the environment.
Litter is beautiful.
Litter is expensive.
(Some of these statements are intentionally negative for the purpose of discussion.)

PLAN OF ACTION

PLAN ONE

1. Record all the things you throw away during the week at home and at school.
2. Try to save and re-use 5 of the above items before throwing away.
3. Did you litter in any way? Did you clean up any litter? How did you feel if you littered or cleaned up litter?

PLAN TWO: Plan your own Plan of Action.

TOPIC: Litter
SUBJECTS: Soc. Studies, Health
EST. TIME: 10 minutes
GRADE: 5

MU

GOODIE TWO SHOE-ING

Activity

ACTIVITY (10 minutes)

Figure out your worst two habits concerning pollution (not using a waste basket if it isn't handy, or looking the other way if a friend litters, etc.). Add two good habits and drop two bad habits, concerning pollution, from your life.

SUGGESTED ADDITIONAL ACTIVITIES

If someone wants you to help them break a habit, figure out how to help.

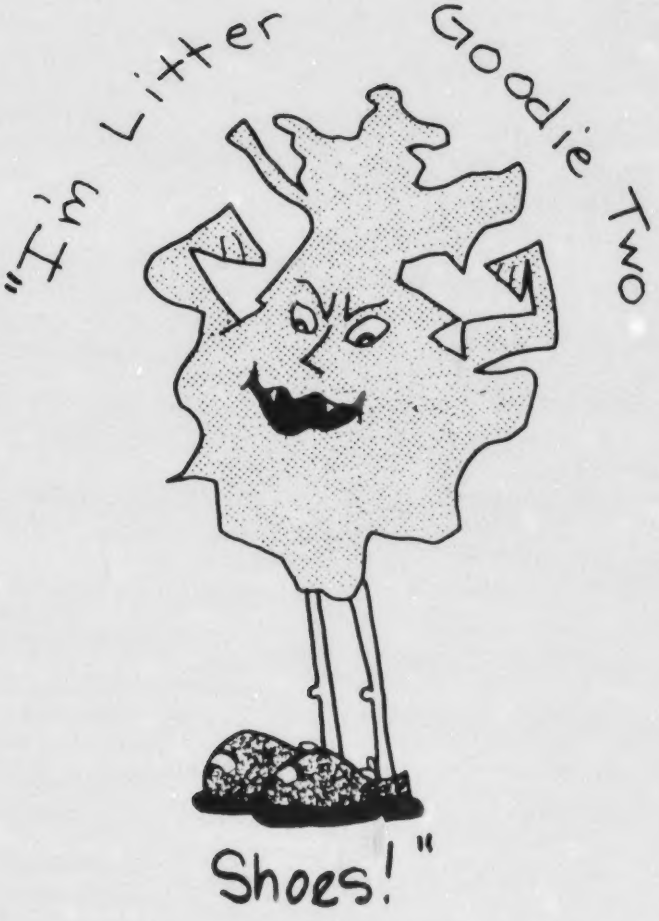
Identify one of the teacher's good habits and help encourage it.

LEVEL V OBJECTIVE

Students will know means of affecting change to environmental problems.

LEVEL VI OBJECTIVE

The student will be able to differentiate between good and bad habits concerning litter.



TOPIC: Animals
SUBJECTS: Science, Math
EST. TIME: 40 minutes initially
GRADE: 5

PET FOOD

PRE-ACTIVITY (10 minutes)

List on board animals students have as pets, or would like to have as pets. Classify the animals according to kinds, colors, physical characteristics (4 legs vs. 2 legs, etc.). Discuss eating habits of different animals.

Activity

ACTIVITY (One week out to Class)

Students with pets inventory amount and kinds of food their pet consumes in one week. Students without pets go to store and inventroy kinds of pet food available and their prices. Then convert the one week usage into a years usage.

POST-ACTIVITY (30 minutes)

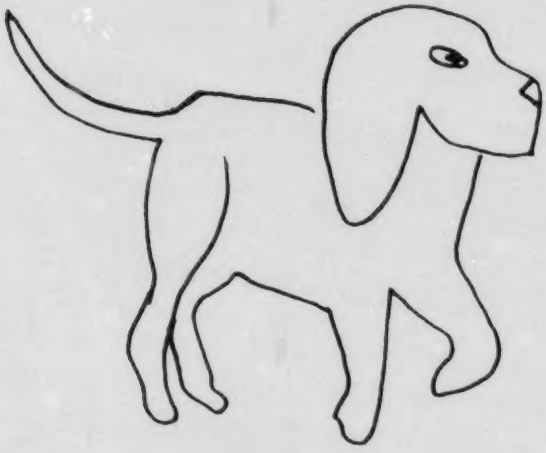
What other expenses do healthy pets normally incur? (Grooming, shots from vet, license.) Group children according to like kinds of pets and have them prepare a cost analysis sheet for one type of pet for one year (grooming, vet expenses, etc. will have to be estimated).

LEVEL V OBJECTIVE

Students will understand relationships between different species.

LEVEL VI OBJECTIVE

The student will recognize that pet food consumption can be measured.



TOPIC: Litter (Local Environment)
SUBJECTS: Health, Soc. Studies
EST. TIME: 60 minutes
GRADE: 5

PRE-ACTIVITY (15 minutes)

Review post activity discussion for "Litter - Mini Environment." Predict types of litter you may find. Predict effects that may have occurred from previous litter, or litter found.

CHECK IT OUT

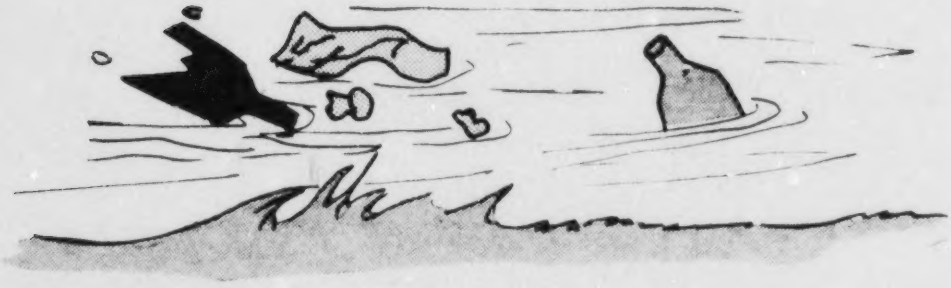
Activity

ACTIVITY (30 minutes)

Go out and survey environment. Record types of litter observed by film, tape recorder, drawings, writings, or collecting. Record possible observable effects from litter.

POST-ACTIVITY (15 minutes)

Predict what this environment might look like, given the current rate or volume of litter found, ten years from now.



SUGGESTED ADDITIONAL ACTIVITIES

Display drawings, pictures on bulletin board or,if you might survey later in the year, arrange scrapbook to be donated to library for future reference.

LEVEL V OBJECTIVE

Students will be able to predict future problems of litter.

LEVEL VI OBJECTIVE

The student, given certain types of litter, will predict cause and future effect.

Materials

MATERIALS

Drawing paper; pencils; tape recorders (battery operated); camera and film; record sheets for recording.

TEACHER BACKGROUND INFORMATION

Fifth grade students choose a local lake, pond or stream for investigation.

TOPIC: Litter
SUBJECT: Health
EST. TIME: 25 minutes
GRADE: 5

LITTER GAME

PRE-ACTIVITY (10 minutes)

Stacks of Means Cards to get rid of litter (41 Litter Means Cards)

Glass Recycle	8
Paper Recycle	8
Metal Recycle	8
Plastic and Garbage Land Fill	16
Litter Barrel	1

Cards of many kinds of litter (use Litter Bug Cards)

Score paper and pencil per player.

Game may be played until one player gets rid of all of his cards, or in rounds, previously agreed upon in numbers of games.

Number 2 to 4 players.

Object: To get the most litter recycled (one point per litter card or cards matched on table), minus litter cards left in each player's hand.

RULES

Deal out all litter cards to all players. Then rotate clockwise from dealer, drawing a means card. Player may discard one litter card or lay down any litter cards that fit the drawn means card. For example, if he has one or more paper litter cards and paper recycle cards, he may place these on the table in front of him.

A game, or round, is over when one player gets rid of all of his cards.

ADDED TWIST

Add one only Litter Bug Card that matches with one only Litter Barrel Means Card.

This card adds 10 pts. to any player's hand if he can match it, no points if he discards it, and minus 10 points if left in his hand at the end of a game or round.

ACTIVITY (10 - 15 minutes)

Play the Litter Game.

LEVEL V OBJECTIVE

The student will know means of affecting change to control litter as an environmental problem.

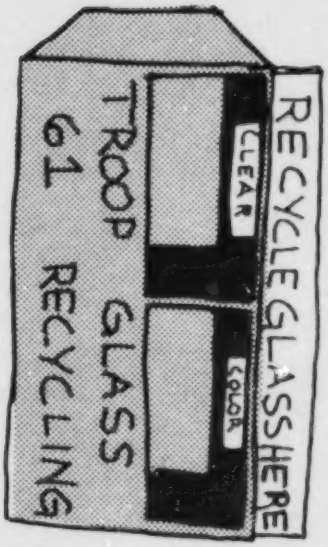
LEVEL VI OBJECTIVE

The student will know specific means of controlling litter such as glass recycling, paper recycling.

Materials

MATERIALS

Use Litter Bug cards from the Litter Bug Game lesson, as well as the Suggested Means of Recycling cards from this lesson.



PAPER RECYCLING

PLASTIC & GARBAGE

LANDFILL

METAL RECYCLING

TOPIC: Litter Bug Cards
SUBJECTS: Soc. Studies, Health
EST. TIME: 20 minutes
GRADE: 5

LITTER BUG CARDS

PRE-ACTIVITY (5 minutes)

Game: Litter Bug, played something like Old Maid

All cards are dealt out.

Players draw clockwise around the circle of players, one card.

As soon as you get 4 of a kind, you may lay them down on the table.

Object is to get rid of all litter cards and not have the "Litter Bug" in your hand.

Activity

ACTIVITY (15 minutes)

Play the "Litter Bug" Game

POST-ACTIVITY (10 minutes)

Added Twist: Make up a small garbage can, one per player. As soon as you have collected 4 of any kind of litter card, put them in.

LEVEL V OBJECTIVE

The student will perceive himself as a part of nature and will desire to control litter.

LEVEL VI OBJECTIVE

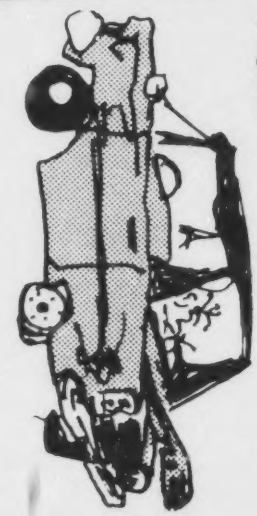
The student will know that litter is harmful to the environment.

Materials

MATERIALS

See attached Litter Bug Cards.

Litter Bug Cards

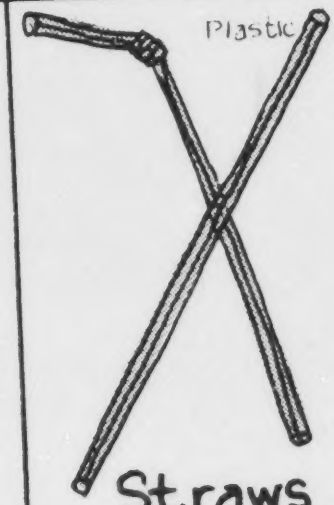


Junk

Litter Bug

Plastics

Wrappers



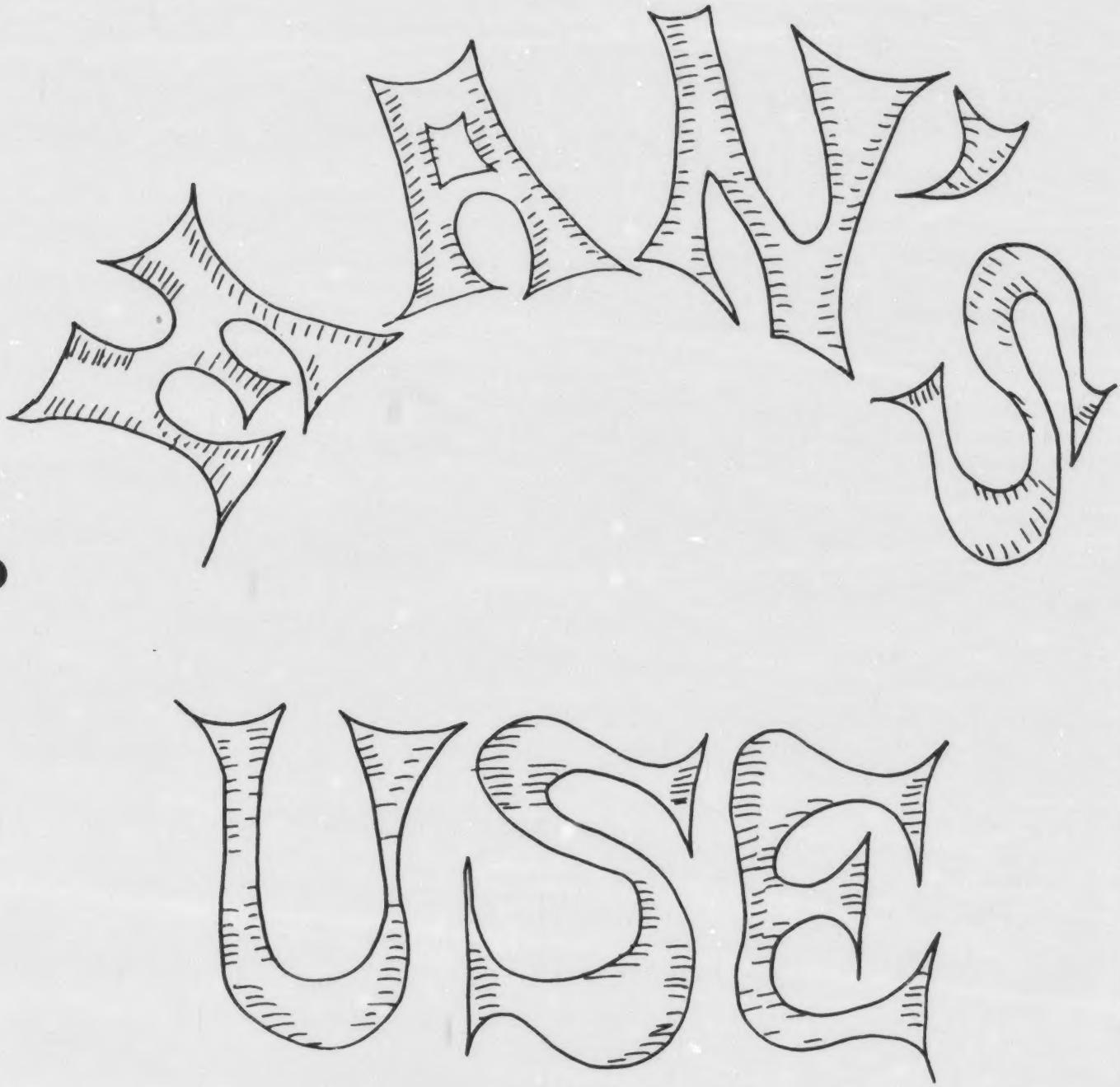
Straws

Paper

Bottles

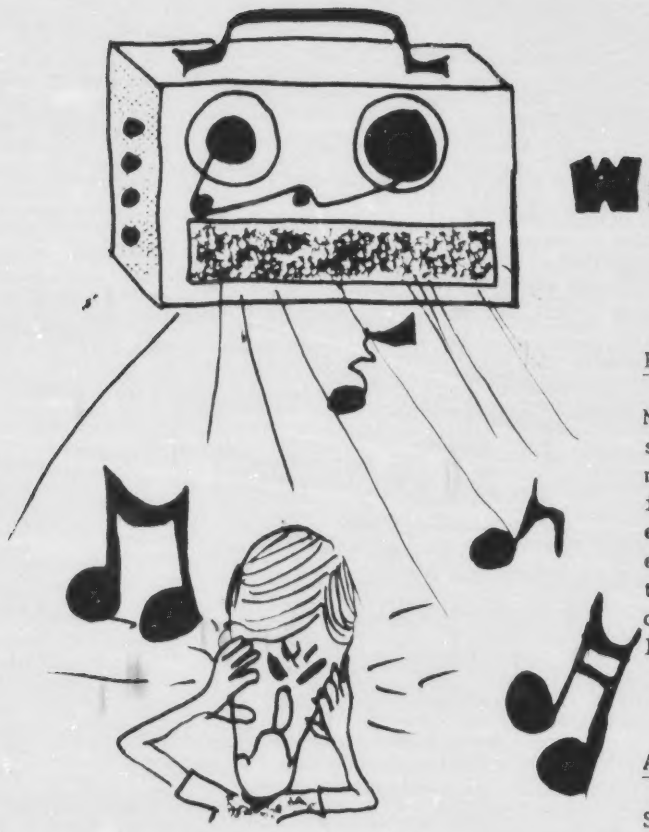
Cans

Garbage


SAVE
USE

TOPIC: Noise Pollution #2
SUBJECTS: Math, Lang. Arts
EST. TIME: 60 minutes
GRADE: 5

MU



WHISTLE TOOT BANG

Activity

PRE-ACTIVITY (15 minutes)

Make a list on the board of students' suggestions of places to record loud noises. Possible suggestions might include stereo, freeways, athletic events, lawnmowers, trains, trucks, etc. Also, have students be assigned to bring in tapes and records from home or library of the above mentioned list.

ACTIVITY (30 minutes)

Students make recordings of loud noises around school. Can bring in records from home. Someone may have a race car album they could contribute. Library may have records of recordings of noises, and the students may have recorded something at home the day before. After recordings are made, then students will sit down to do some multiplication exercises while the tapes of loud noises are playing.

POST-ACTIVITY (15 minutes)

Ask students how they felt about these noises. Which noises bothered them most? Did the noise make them nervous? How did the noise bother them or effect them. Did any one noise calm them?

LEVEL V OBJECTIVE

1. Students shall recognize various pollution problems, their causes and effects.

2. Students will understand problems of population density and dispersion.

LEVEL VI OBJECTIVE

The student will know that certain noises, such as car horns, loud music, can be distracting when concentration is necessary.

Materials

MATERIALS

Tape recorders (battery operated); records; tapes

TEACHER BACKGROUND INFORMATION

This is a two day activity. Fifteen minutes or so on the first day.

SUGGESTED ADDITIONAL ACTIVITIES

Get a decibel reader - police have them or a hearing specialist may have one. They record the loudness of a noise. Check the decible reading of the noises collected in activity above and get some more recordings, to see if they are legal or in accordance with police specifications.

TOPIC: Chemical Pollution (Detergents #2)
SUBJECTS: Science, Lang. Arts
EST. TIME: 65 minutes
GRADE: 5

CHEMICAL POLLUTION

Activity

PRE-ACTIVITY (15 minutes)

Review what happened in the Pollution Detergent Activity #1. Discuss how you are going to set up the experiment. Put students in groups of three. Label one student's jar water, one sodium nitrate, and one sodium phosphate.

ACTIVITY (30 minutes to set up experiment and record 1st day. 5 minutes each day after)

Put gravel in bottom of jar. Put in plant life. Add water. In nitrate jar, put in 1/2 teaspooon and in phosphate jar put in 1/2 teaspoon. In jar marked water, put in no chemicals. This will be the control aquarium. Keep a daily record (possibly every other day at first) of observations. After six or seven days, add another 1/2 teaspoon of each chemical. The students can compare, in their groups, the two jars with chemicals to the control jar.

POST-ACTIVITY (20 minutes)

About Two Weeks Later

1. What did you notice about the plants in the jars?
2. Were there any differences or similarities between the jars?
3. What kind of changes took place? Illustrate an example.
4. Where did you find the most change?
5. Based on observations and discussion, what changes would you find in fresh water, streams and ponds, polluted with detergent run off.

SUGGESTED ADDITIONAL ACTIVITIES

You could have part of the students use the following household items in their aquariums if you didn't want the whole class to do the above; use teaspoons of baking soda, epsom salts, vinegar, bleach and ammonia.

LEVEL V OBJECTIVE

1. Students will understand adaptations of plants and animals.

2. Students will comprehend relationships among all organisms and their non-living environment.

3. Students shall recognize various pollution problems, their causes and effects.

4. Students will be able to predict future problems and understand man's responsibility for prevention of those problems.

LEVEL VI OBJECTIVE

The student will know that certain levels of sodium nitrate, and sodium phosphate have adverse effects on the growth of bean seedlings.

MATERIALS

Plants (elodea or duckweed from some nearby pond); one quart jar per student; solid ammonium nitrate and solid potassium phosphate. These chemicals could be obtained at a drug store, junior high or high school. Masking tape for labels; gravel.

TEACHER BACKGROUND INFORMATION

Jars should all be the same size. Jars should be placed in the same amount of sunlight. Jars should be set up all the same. Phosphate and nitrate is used in detergents to produce whiter and cleaner wash, more quickly. Store and use chemicals carefully.

TOPIC: Noise Pollution #4
SUBJECTS: Science, Lang. Arts
EST. TIME: 35 minutes
GRADE: 5

MU

PRE-ACTIVITY (15 minutes)

Based on observations made in Noise Pollution Activities 1 and 2, predict the effects of different noises on plants. Discuss time limit of subjecting noise and types of noise to use, and other appropriate variables necessary to talk about in setting up experiment. Divide students into teams of 2 or more.

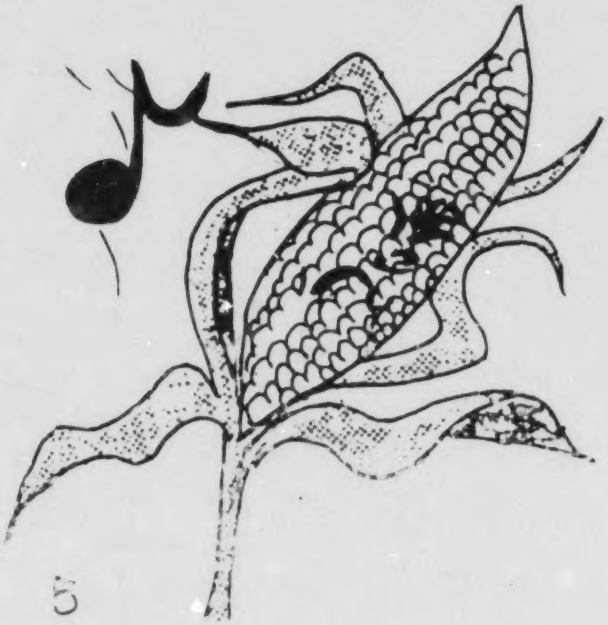
SH-H-H-H-H

ACTIVITY (5 minutes each day)

Conduct experiment and record in short sentences the observations that you make from day to day.

POST-ACTIVITY (15 minutes)

1. What did you notice about the plants subjected to noise?
2. What are some possible reasons for this change?
3. What can we say about the affects of sounds on plants?
4. Were there any similarities between the sounds and the affects on plants and humans?
5. Based on our observations and discussions, what can we say about sound in our environment?



LEVEL V OBJECTIVE

1. Students shall recognize various pollution problems, their causes and effects.

2. Students will understand problems of pollution density and dispersion.

3. Students will understand how the structural and behavioral changes of plants and animals takes place.

SUGGESTED ADDITIONAL ACTIVITIES

Vary the distance of the noise source and compare.

LEVEL VI OBJECTIVE

The student will know the effect of various noise levels on the growth of bean seedlings.

TEACHER BACKGROUND INFORMATION

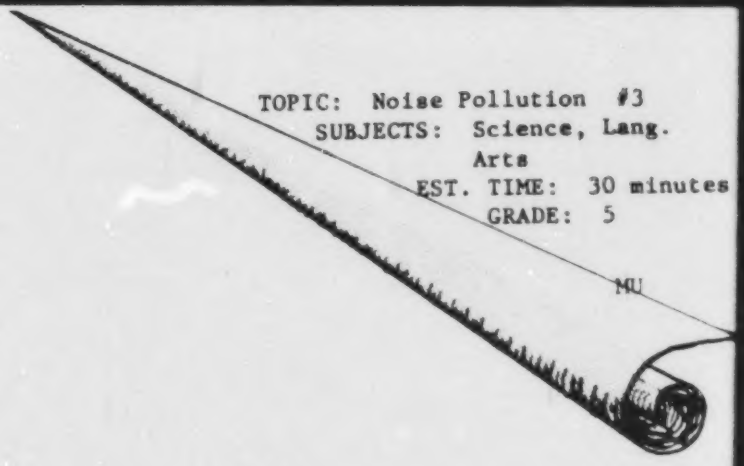
Read Noise Pollution Activities, numbers one through three, 5th grade. Also refer to Chemical Pollution Activities numbers one and two for directions on planting, etc.

Materials

MATERIALS

Bean plants , one plant per noise and one or two control plants for the whole group; different noise recordings; clock or timer; tape recorder; box or cabinet to subject plant to noise in.

TOPIC: Noise Pollution #3
SUBJECTS: Science, Lang. Arts
EST. TIME: 30 minutes
GRADE: 5



NOISE MUFFLERS Activity

PRE-ACTIVITY (10 minutes)

Discuss noise mufflers - i.e. carpets, drapes, accoustic tiles, etc.

List student responses on the chalkboard:

1. What do you see as you look around the classroom?
2. What are some things that are helping to make the room more quiet?
3. In what ways are the sound "mufflers" alike?

ACTIVITY (20 minutes)

Inventory classrooms, library and gym for such items. Make a written list of noise mufflers.

POST-ACTIVITY (20 minutes)

Repeat above inventory in different rooms of homes.

Make a written list of noise mufflers.

Based on our observations and discussion, what can we say about our classroom and our homes?

SUGGESTED ADDITIONAL ACTIVITIES

Inventory a natural setting for sound mufflers.

Take a sound hike.

LEVEL V OBJECTIVE

1. Students shall recognize various pollution problems, their causes and effects.

2. Students will understand problems of population density and dispersion.

LEVEL VI OBJECTIVE

The student will know the differences between positive and negative noise suppressors.

Materials

MATERIALS

Pencil and paper

TOPIC: Chemical Pollution (Detergents #1)
SUBJECTS: Science, Math, Lang. Arts
EST. TIME: 40 min. over 2 weeks
GRADE: 5

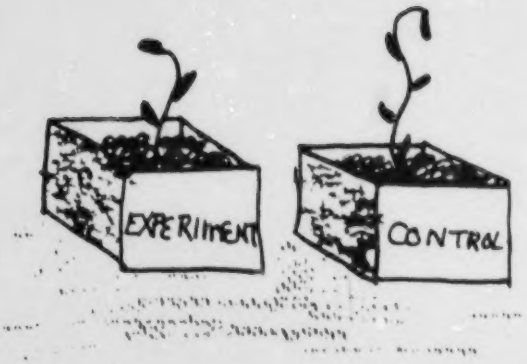
MU

CHEMICAL POLLUTION

PRE-ACTIVITY (15 minutes to plant seeds, 5 minutes per day for 2 weeks for watering)

Plant bean seeds. It takes about two weeks to have a seedling.

Planting in pint size milk carton is recommended. Plan out concentrations, i.e., two Tablespoons per quart of H_2O, four Tablespoons per quart, etc.



Activity

ACTIVITY (5 minutes per day of one week)

One or Two Weeks Later -

Take an established bean seedling and water with different concentrations of water and laundry detergent. Have each student make up watering solutions-concentrations. Agree upon a unit of measure so that all plants are watered equally. Have students record results over one week period.

POST-ACTIVITY (20 minutes)

One Week Later

Compare results within groups, and group to group.

Graph results if you wish.

Discuss what is in the detergents that could be affecting these plants. The students may come up with the phosphates and nitrates. If not, you can suggest it and go to Pollution Detergents #2 to test out these additives.

LEVEL V OBJECTIVE

1. Students shall recognize various pollution problems, their causes and effects.

2. Students will comprehend relationships among all organisms and their non-living environment.

LEVEL VI OBJECTIVE

The student will know that chemical detergent levels will have adverse affects on the growth of bean seedlings.

MATERIALS

Quart jar per student; same type of soil; as many different types of laundry detergent as possible; tablespoons; bean seeds; milk cartons (pint size), one per student.

TEACHER BACKGROUND INFORMATION

Store plants in same general location. Water at same time and only once a day. Chart attached may be used or design own.

CHART

Each group has five students, with one kind of detergent per group. One student in the group waters with a 2 tablespoon concentrate, one student with a 4 tablespoon concentration, one student with a 6 tablespoon concentration, one with an 8 tablespoon concentration, and one with a 10 tablespoon concentration. Each student mixes his concentration in the same amount of water, and each student waters soil only, not the leaves.

_____ Tablespoon Concentration

Day	Observation (to be written in)
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

TOPIC: Air Pollution
SUBJECTS: Science, Math, Lang. Arts
EST. TIME: 65 minutes
GRADE: 5

MU

VEHICLE POLLUTION Activity

PRE-ACTIVITY (10 minutes)

Divide class into equal groups.

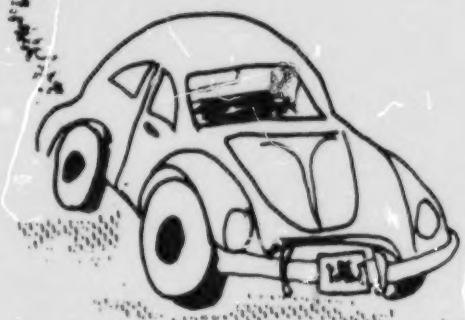
ACTIVITY (30 minutes)

Get one car or vehicle per group. Tape a filter on the end of the tail-pipe. Time how long the car was running with the filter on. All agree on a time limit for length of time or each group may have their own length of time (not more than five minutes). After one try, each group switches to another group's car, to check the validity of the results.

POST-ACTIVITY (25 minutes)

Bring filters in. Divide chalkboard up into allotted times chosen by students during the activity. Have students tape filters next to length of time they used (example: All people who left filter on for 1 minute, tape filter next to 1 minute on board). Have students observe all filters. Ask the following questions:

1. What do you notice about all the filters on the board?
2. What similarities do you see?
3. What differences do you see?
4. Based on these observations, how did the lengths of time compare to the amount of carbon on samples taken?
5. Write a general statement about exhaust based on data and discussion.



SUGGESTED ADDITIONAL ACTIVITIES

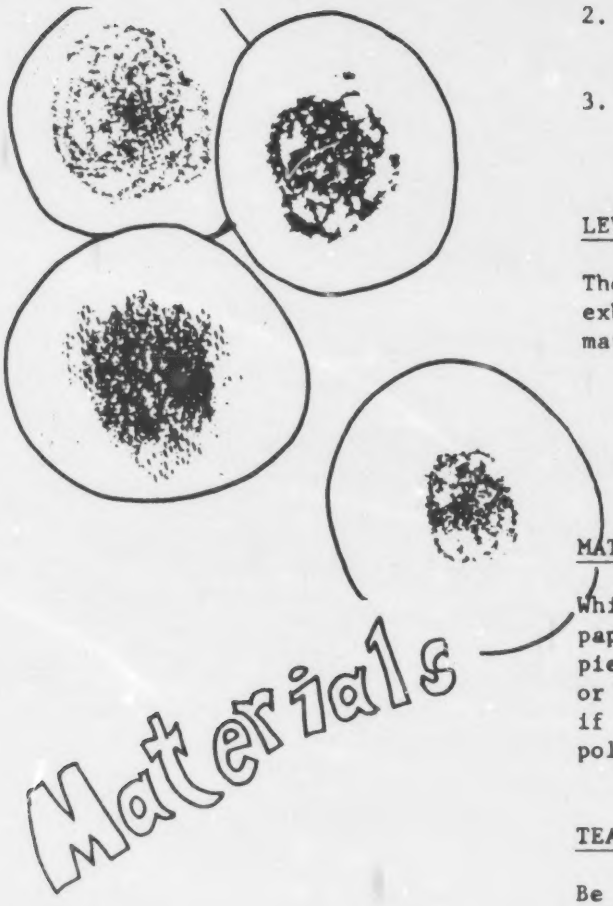
Compare types of vehicles: Trucks, busses, motorcycles. Make a bulletin board of actual pieces of filter paper used in experiment and identify type of vehicle and year.

LEVEL V OBJECTIVE

1. Students shall recognize various pollution problems, their causes and effects.
2. Students will understand problems of population density and dispersion.
3. Student will comprehend man's role in eco-repair previously inititated and ongoing.

LEVEL VI OBJECTIVE

The student will know that automobile exhaust emissions contain particulate matter.



MATERIALS

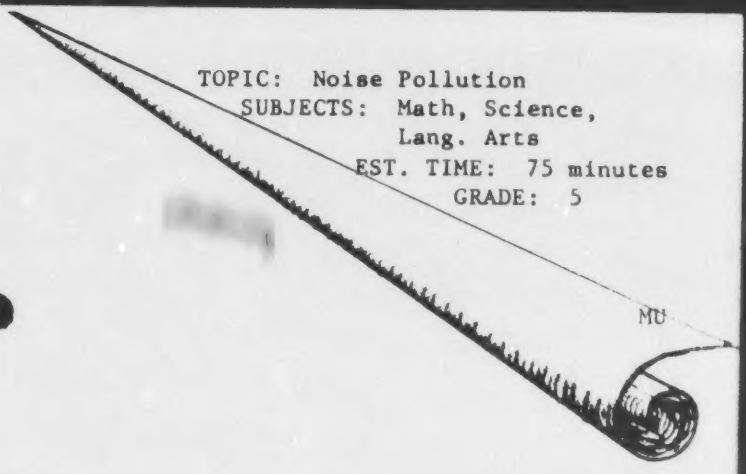
White coffee filters or white construction paper, or any white filter paper (two pieces per group at least); stop watch or watch with second hand (one per group if possible); cars (at least one with pollution control and one without)

TEACHER BACKGROUND INFORMATION

Be sure time is taken to discuss the safety of this activity. Use teacher aids to start cards and supervise. Distribute materials in class.

TOPIC: Noise Pollution
SUBJECTS: Math, Science, Lang. Arts
EST. TIME: 75 minutes
GRADE: 5

BEEP BEEP



Activity

PRE-ACTIVITY (15 minutes)

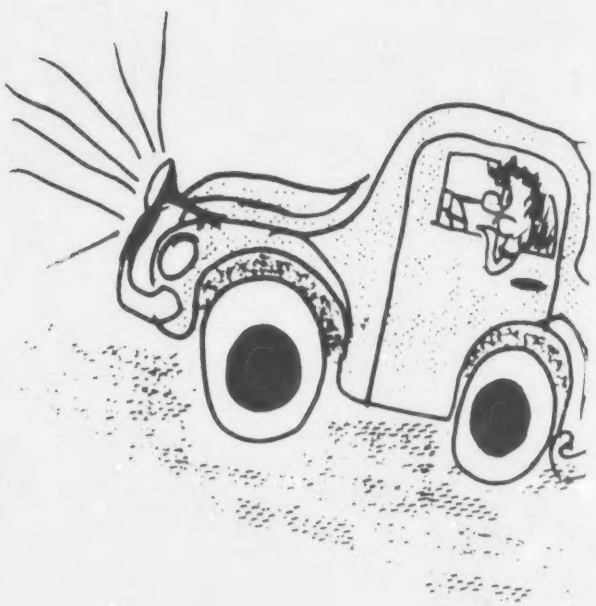
Discuss use of tape recorder. Discuss use of recording data device. Break into teams of 2 (one student writes, one works tape recorder, you beep the horn).

ACTIVITY (30 minutes)

Go to site. Plot data on line graph or whatever recording device you used.

POST-ACTIVITY (15-30 minutes)

1. What did you notice about the sound?
2. Where was the sound the loudest?
3. How did the sound change as you moved farther from the source?
4. Could you have used another noise source besides a horn? Try some suggestions.
5. How far away would you predict you could get before the horn could not be heard?
6. Would a windy day change your results? Try it.



LEVEL V OBJECTIVE

1. Students will recognize the various pollution problems, their causes and effects.

2. Density limits space and space affects noise level.

LEVEL VI OBJECTIVE

The student will know that sound reception is realted to the distance from the source of the sound.

Materials

MATERIALS

Tape recorder (battery operated); horn (car, truck, airhorn); meter stick or yard stick; paper and pencil for recording. Use some type of recording device (such as that attached) where the noise is measured by meters or yards, depending on your measuring stick.

RESOURCES

"Science and Children," Vol.10, #6, March 1973, p.28.

PUBLIC SERVICE

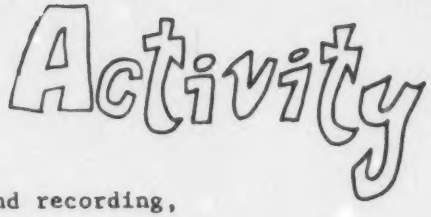
TOPIC: Social Interaction
SUBJECT: Lang. Arts
EST. TIME: 20 minutes
GRADE: 5 or 6

PS

ARTICLE "SUMS"

PRE-ACTIVITY (5 minutes)

1. Divide class.
2. Distribute article to reader.
3. Give following directions to reader:
   A. Read article to group.
   B. Randomly pick on group member to summarize article, as read.
4. Ask recorder to list what happened in group.



ACTIVITY (5 minutes)

Reading, summarizing and recording, according to the above.

POST-ACTIVITY (10 minutes)

Discuss or list on board four problems your group encountered? How could or did your group solve these? Compare with recorders observations. Based on this experience, what can we say or conclude about listening and communication?

LEVEL V OBJECTIVE

The student will be able to understand relationships between members of one species, i.e., cooperation and social interaction.

LEVEL VI OBJECTIVE

The student will be able to identify problems in interpersonal communication such as failure to listen properly, not weighing the pros and cons, too much emotion and speaking out of turn.

Materials

MATERIALS

Short news article, one per group; one recorders sheets per group (see attached).

TEACHER BACKGROUND INFORMATION

Divide class into groups containing six members. Appoint one reader per group and one recorder.

READER WORKSHEET

1. Did your group begin to work together?

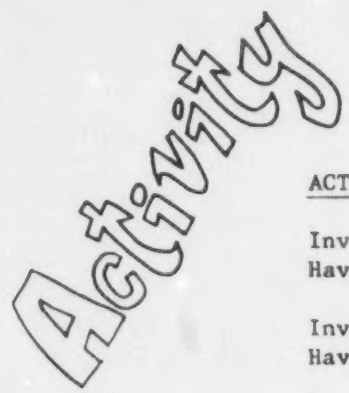
2. When did they begin to work together?

3. What factors caused this to happen or not happen?

TOPIC: Social Interaction
SUBJECT: Lang. Arts
EST. TIME: 25 minutes
GRADE: 5

PS

STORY GOSSIP



PRE-ACTIVITY (5 minutes)

Select and remove three students to a "sound proof" room where they cannot hear the story.

Read nonsense story aloud to remaining class.

ACTIVITY (10 minutes)

Invite person #1 back into class.
Have class tell the story to person #1.

Invite person #2 back into class.
Have only #1 tell the story.

Invite person #3 in and have only #2 tell the story.

POST-ACTIVITY (10 minutes)

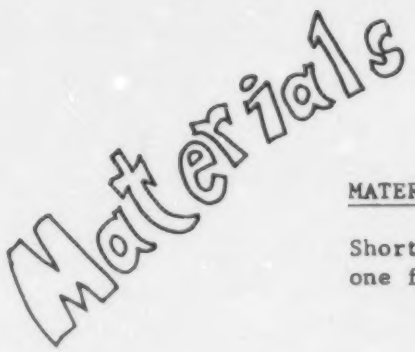
Did the story change any from person to person?
How did the story change? What caused these changes?

LEVEL V OBJECTIVE

Students will understand relationships between members of one species.

LEVEL VI OBJECTIVE

The student will know the importance of accurate listening.



MATERIALS

Short, uncomplicated nonsense story, one for each team.

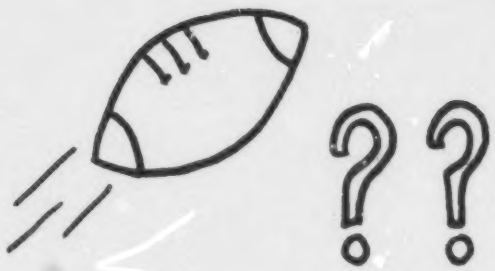
TEACHER BACKGROUND INFORMATION

Type brief nonsense story on cards for later comparison. (The stories may be alike or different as you wish.)

TOPIC: Social Interaction
SUBJECT: Lang Arts
EST. TIME: 40 minutes
GRADE: 5

PS

FOOTBALL



Activity

PRE-ACTIVITY (10 minutes)

Have students count off by "4's"
Have the One's come up while teacher explains Role A.

Have the Two's come up while teacher explains Role B.

Have the Three's come up while the teacher explains Role C.

Have the Four's come up while the teacher explains Role D.

Direct students not to tell role.

ACTIVITY (15 minutes)

Group students so that each group has all four roles and the problem to solve.

At the end of five minutes, have students swap roles at random.

POST-ACTIVITY (15 minutes)

Discuss:

Have you ever played any of these roles before?

Which role was the most difficult, etc.?

Was your group able to solve the problem? Why or why not?

LEVEL V OBJECTIVE

Students will understand relationships between members of a species, i.e. role playing.

LEVEL VI OBJECTIVE

The student will realize there are useful and non-useful roles in problem solution.

Materials

MATERIALS

See attached Role Cards.

TEACHER BACKGROUND INFORMATION

Explain what to do.

Role A

SMOOTHER MOVER

You are to play the Smoother Mover role in solving the following problem:

The Problem: It is 50° outside - your group has to decide whether or not to play a game of football. It is not raining, but has showered on and off all day.

Smoother Mover - always soothes over a discussion:
"Everything in due time."
"The sun will shine tomorrow."
"Don't get upset, it will all workout."

Role B

ATTACKER

You are to play the Attacker role in solving the following problem:

The Problem: It is 50° outside - your group has to decide whether or not to play a game of football. It is not raining, but has showered on and off all day.

Attacker - always attacks ideas presented or will be negative.
"You know the coach will never go along with that."
"Our group won't play without pay."

Role C

CAN'T STAY ON THE SUBJECT

You are to play the Irrelevant role in solving the following problem:

The Problem: It is 50° outside - your group has to decide whether or not to play a game of football. It is not raining, but has showered on and off all day.

Irrelevant - ideas given that do not relate to the topic (evader).
"Did you see the movie last night?"
"When are we going out for P.E.?"
"It's time to go home."

Role D

SENSIBLE (You are to start the discussion.)

You are to play the Sensible role in solving the following problem:

The Problem: It is 50° outside - your group has to decide whether or not to play a game of football. It is not raining, but has showered on and off all day.

Sensible - always try to be as sensible as possible.
"Let's review where we are."
"Why don't we get back to the purpose of the meeting."

TOPIC: Social Interaction
SUBJECT: Lang. Arts
EST. TIME: 30 minutes
GRADE: 5

PS

SIX BITS

Activity

PRE-ACTIVITY (10 minutes)

Divide into groups of six (if a group has less than six members, give more than one bit per person). Explain ground rules.

1. Give one bit of information to each group member unless the above situation applies.
2. Tell students there is a problem to solve.
3. You can tell your group what is on your paper, but you can't show it to anyone.
4. Use some method to write down solution to problem.

ACTIVITY (10-15 minutes)

Class begins working on problems and bits of information.

POST-ACTIVITY (5 minutes)

Discuss:

1. How long did it take your group to begin working on the written problem?
2. Did anyone emerge as a leader in your group to help organize.
3. Did everyone trust what each person read off their paper?
4. How long did it take your group to solve the problem?

LEVEL V OBJECTIVE

1. The students will know and apply problem solving techniques to environmental problems.

2. Students will understand relationships between different species.

LEVEL VI OBJECTIVE

The student will recognize that there is a process used in group problem solving.

MATERIALS

Six pieces of information including a statement of the problem.

TEACHER BACKGROUND INFORMATION

During the activity, go around to help reinforce the ground rules. The process used in trying to solve the problem is much more important than the actual solution.

CREDITS

Ernie and Char McDonald

INFORMATION BITS

1. Although you may tell your group what is on this slip, you may not pass it around for others to read.

   INFORMATION

   The Jets played the Colts the second game of the season.
   The captain of the Rams had good plays for his team.
   The 49er's won the toss and received the kickoff in the first game.

2. Although you may tell your group what is on this slip, you may not pass it around for others to read.

   INFORMATION

   Each team played the other three teams once.
   The Rams won their first game even though they had to kick off.
   The Colts had the best defense and held their opponent scoreless in the third game of the season.

3. Although you may tell your group what is on this slip, you may not pass it around for others to read.

   INFORMATION

   Each team had chosen their own name.
   The Jets lost to the Colts the second game of the season.
   Each team had made up plays and executed them well.

4. Your group members have all the information needed to find the answer to the following question. Only one answer is correct. You can prove it.

   INFORMATION

   In what order did the Rams play the four other intramural football teams?

5. Although you may tell your group what is on this slip, you may not pass it around for others to read.

   INFORMATION

   The Rams were held scoreless in the third game of the season.
   The Jets tied the 49er's 6-6 in the fourth game of the season.
   After each team had played two games each, the Colts were still undefeated.

Information (cont.)

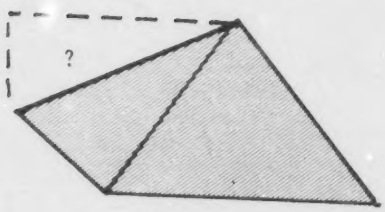
6. Although you may tell your group what is on this slip, you may not pass it around for others to read.

INFORMATION

The Rams played better football as the season went on. The 49er's upset the Colts in the last game of the season. The Rams passed their way to victory against the team that had tied the 49er's in the previous game.

TOPIC: Non-Verbal Social Interaction
SUBJECTS: Language Arts, Social Studies
ESTIMATED TIME: 20 minutes
GRADE: 5
PS

NON VERBAL SQUARE



PRE - ACTIVITY (3 minutes)

Place packet of pieces in center of work area or table. Have each student select four pieces from center, without talking!

ACTIVITY (5 minutes)

Teacher states directions and task. Time will determine winners, but limit activity to five minutes.

Do not answer questions, but repeat directions and task. Do not over-talk.

POST ACTIVITY (10 minutes)

Discuss:

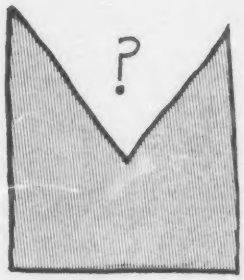
1. How did you feel about the limited directions given?
2. What problem did you encounter in trying to do the task?
3. How did you feel during the give and take of pieces?

LEVEL V OBJECTIVE

Students will understand relationships between members of a species, i. e., cooperation and social interaction.

LEVEL VI OBJECTIVE

The student will recognize that problems can be solved non-verbally.



MATERIALS

One packet per four students, containing four squares cut into four pieces. See attached.

TEACHER BACKGROUND INFORMATION

Directions:

NO TALKING AT ALL!!

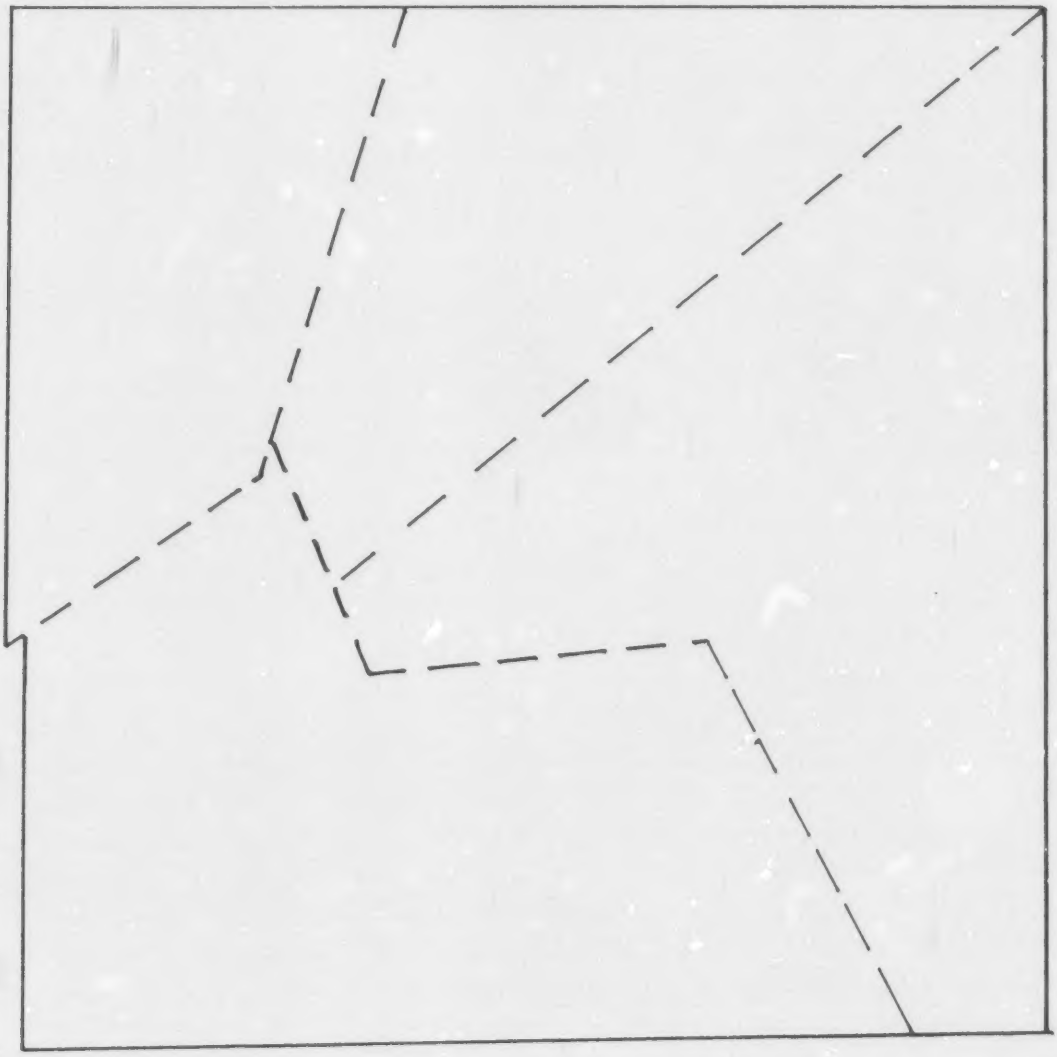
Task is to be the first group to put four squares together.

CREDITS

Ernie and Char McDonald

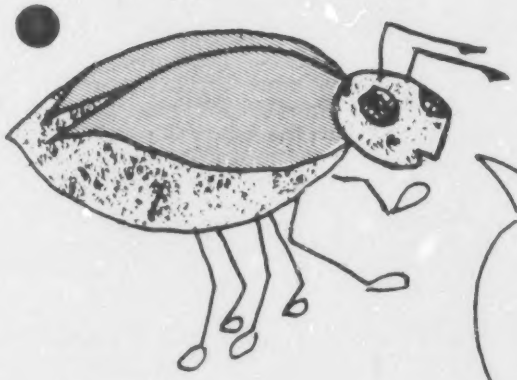
MATERIALS

Cut out for square pieces.



TOPIC: Social Interaction
SUBJECT AREA: Language Arts
ESTIMATED TIME: 25 minutes
GRADE 5

PS.



KAKA WHACKA!!

PRE - ACTIVITY (5 minutes)

1. Divide class into pairs.
2. Give directions and examples orally.
3. Distribute ditto worksheets.
4. Note: A uses score sheet section when B reads, and B uses score sheet section when A reads.

ACTIVITY (10 minutes)

Have students complete worksheets working in pairs. Have students correct by giving one point per correctly identified feeling.

POST ACTIVITY (10 minutes)

Discuss tone of voice. Discuss any similarities between emotions and feelings.

Perhaps group or classify emotions as to similarities and differences.

LEVEL V OBJECTIVE

Students will understand relationships between members of a species, i. e. voice communication.

LEVEL VI OBJECTIVE

The student will recognize that tone of voice affects the meaning of a statement.

MATERIALS

See attached exercise.

TEACHER BACKGROUND INFORMATION

Make up ditto sheets. Practice saying phrase for demonstration to class. Students are to convey emotion by saying the same phrase in different tones of voice.

SUGGESTED ADDITIONAL ACTIVITIES

Discuss non-verbal communications (motions, etc.) that would go with each emotion.

EXERCISE IN LISTENING

In pairs, have person "A" say the nonsense phrase expressing the feelings shown in the right-hand column. Person "B" should listen for the feeling being expressed and write (on the score sheet) the word or phrase that describes that feeling.

Person A Says	What the Person is Feeling
1. Kaka whacka, zak, zak, boom-rak	1. Excited
2. " "	2. Worried
3. " "	3. Amazed
4. " "	4. Bitter
5. " "	5. Angry
6. " "	6. Thankful
7. " "	7. Confident
8. " "	8. Wanting forgiveness
9. " "	9. Discouraged
10. " "	10. Back off - I've got the picture

SCORE SHEET

The other person in your group will read several statements. Write down the feelings expressed in each statement.

1. _____ 6. _____

2. _____ 7. _____

3. _____ 8. _____

4. _____ 9. _____

5. _____ 10. _____

PROBLEM SOLVING

STREAM STUDY

Topic: Stream Study #1
Subject Area Language Arts
Estimated Time:
35 minutes
Grade: 5 or 6
FS

PRE - ACTIVITY (5 minutes)

Inform the students what they will be doing for the next few days. Set your boundaries and rules you feel are necessary before going out.

STREAM STUDY

Activity

ACTIVITY (10 - 15 minutes)

See Task #1

POST ACTIVITY (15 minutes)

1. What did you notice about the plants of this environment?
2. What did you notice about the animals? Any signs of animals that aren't here? What kinds of animals?
3. What did you notice about the physical characteristics? (The rocks, the stream bank, the course of the water.) Any gravel, rock, or sand bars?
4. Has anyone seen this stream when it ran a different course?
5. Could this stream run a different course? How or why?

LEVEL V OBJECTIVE

The student will be able to identify plants and animals of his local environment.

LEVEL VI OBJECTIVE

The student will know that the stream has a diversified environment such as variations in plants, animals, air, rock and water.

TEACHER BACKGROUND INFORMATION

This study is going to take a few days. Before beginning this study, the students need to be prepared for working outdoors. If needed, refer to the guidelines for Teaching Children Outdoors. Many of the things here have also been adopted for the puddle study. We begin this lesson by taking an overall view of our stream and noting the obvious living and nonliving characteristics. Then we go to the stream's edge to collect and closely scrutinize the aquatic life, and in turn make a general attempt to identify the specimens found. Then we'll review the necessary non-living factors animals need in order to live in our stream environment and check some data cards, and finally predict some outcomes of the nonliving factors. Then comes the "testing out" of these predictions, and we'll see a correlation between the non-living and living factors of our stream. We will then assume our stream must supply water for our community and proceed to ascertain how many people the stream could support. Then we can discuss some of our feelings and values about water. We will do this study once in the fall and once in the spring. Thus we will be able to figure when our stream flows most and we can entertain the idea of a reservoir, or should we save water for the summer time? And is there a time when the stream is bountiful with life?

The first couple of times out may possibly amount to little because the students will not be all that familiar with the proceedings, so don't plan too much for your allotted time. The estimated times include only time necessary for activities on plans and don't include time for going to and coming from the stream. If you don't complete a lesson, they are easily continued the next day.

MATERIALS

Task Card #1; pencils
clipboard

Materials

RESOURCES

Investigating Your Environment Series, U.S. Forest Service, Portland, OR.

TASK #1 (10 - 15 minutes) Work by yourself or in small groups.

As you approach the stream, observe and record your observations about the stream environment: (Can be done visually or verbally.)

Plants: _____

Animals: _____

Air: _____

Rocks: _____

Water: _____

Topic: Stream Study #2
Subject Areas: Science - Language Arts
Estimated Time: 60 minutes
Grade: 5 or 6

PRE - ACTIVITY (10 minutes)

Discuss:

1. If you had any kind of animal at home, what are some things you would do to take care of it?
2. What do animals that live in water need to live?
3. Where would you look to find animals in the water?
4. How should we treat animals that we find in the water when we are collecting them and observing them?

ACTIVITY (35 minutes)

See Task #2 (Go from group to group and see how they are doing.) See Task #3

POST ACTIVITY (15 minutes)

Clean up equipment.

LEVEL V OBJECTIVES

1. The student will be able to identify plants and animals of his local environment.

2. The student will be able to inventory a given environment.

LEVEL VI OBJECTIVES

The student will be able to identify aquatic life using a reference book such as the Nature Guide Pond Life Book.

Materials

MATERIALS:

As much of the following equipment as possible:

Jelly cups or baby food jars for collecting aquatic animals.

Four white dishpans to put all specimens in for small group observation.

Ten plankton nets made from baby food jars and old nylons.

Golden Nature Guide Pond Life Books.

Task Cards #2 and #3.

One hand lens per two students.

TEACHER BACKGROUND INFORMATION

Have groups, 4 or 5 per group, designated before going out into environment. Each group could also decide who is going to do what so all will have a job. Some jobs or activities will be done by all. Students need to be shown how to use this simple equipment.

RESOURCES

Investigating Your Environment Series
U. S. Forest Service
Portland, Oregon

TASK #2

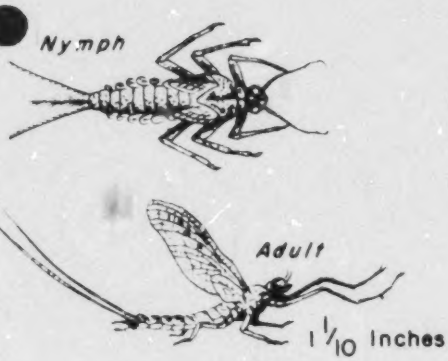
Go out with your group to the stream and collect as many different kinds of aquatic life as you can. Use the equipment your group is taking. Put all the aquatic life in the white dishpan for your group to observe. When you feel you have all you can find, contact your instructor to get the next task.

TASK #3 Using the attached picture keys, and your Golden Nature Guide Pond Life Book, if you desire, generally identify the specimens you found. List or sketch the animals you found below.

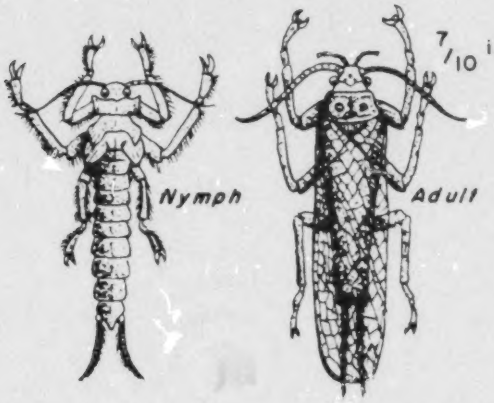
Description of where found	Type (name or sketch)	Number

Return animals to water as soon as you are finished.

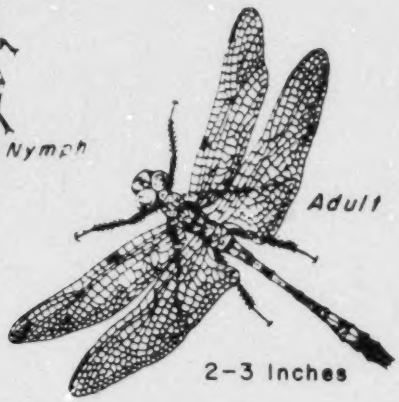
AQUATIC INSECTS



MAYFLY



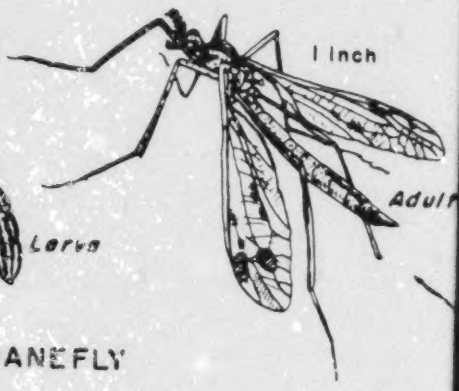
WATER STRIDER



DRAGONFLY

STONEFLY

WHIRLIGIG BEETLE

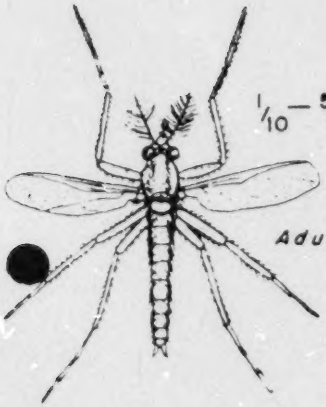


CRANEFLY

BLACK FLY

MOSQUITO

CADDISFLY



MIDGE

Topic: Stream Study #3
Subject Area: Science
Estimated Time:
50 minutes
Grade 5 or 6

PS

PRE - ACTIVITY (20 minutes)

Using data collected at stream's edge day before, discuss:

1. What animals did you find? Compile a list on board. Each Student should record the group list on his lab sheet.
2. Where were most of the specimens located?
3. What similarities and differences are there?
4. How could we classify the animals we found?
5. What other life might be found in this stream?
6. Would we be likely to find the same specimens in a different aquatic environment? Why or why not?

STREAM STUDY

Activity

ACTIVITY (10 minutes)

Review the things we said animals needed in order to live in the water. (pH, O_2, temp., etc.)
Assign Task #4

POST-ACTIVITY (10 - 15 minutes)

Discuss as a whole group:

1. Plot or post many predictions on board.
2. Discuss the range of predictions.
3. What criteria did you use to arrive at your predictions?
4. How can we test our predictions?

LEVEL V OBJECTIVES

The student will know the classification systems of the various forms of plant and animal life.

LEVEL VI OBJECTIVE

The student will be able to predict, based on pH, oxygen content, and temperature of water, the types of aquatic life to be found in a given stream.

Materials

MATERIALS

Blackboard or large chart paper.

Task Card #2, and #3 data collection sheet.

Analyzing data sheets, at least one per two students.

Task #4.

RESOURCES

Investigating Your Environment Series
U. S. Forest Service
Portland, Oregon

ANALYZING DATA

pH RANGES THAT SUPPORT AQUATIC LIFE:

	MOST ACID 1 2 3 4 5 6 7 8 9 10 11 12 13 14 NEUTRAL MOST ALKALINE
Bacteria:	1.0{----------}13.0
Plants (algae, rooted plants, etc.)	6.5{----------}12.0
Carp, suckers, catfish, some insects	6.0{----------}9.0
Bass, crappie	6.5{-------}8.5
Snails, clams, mussels	7.0{-------}9.0
Largest variety of animals (trout, mayfly, stonefly, caddisfly)	6.5{---}7.5

DISSOLVED OXYGEN REQUIREMENTS FOR NATIVE FISH AND OTHER AQUATIC LIFE:

DISSOLVED O_2 (parts per million)

Cold-Water Organisms (below 68°F) such as salmon and trout:
- Spawning.....7 ppm and above
- Growth and well-being.....6 ppm and above

Warm-Water Organisms (above 68°F) such as bass and crappie:
- Growth and well-being.....5 ppm and above

APPROXIMATE TEMPERATURE RANGES REQUIRED FOR GROWTH OF CERTAIN ORGANISMS:

TEMPERATURE		ORGANISMS
Greater than 68°F (warm water)		Much plant life, many fish diseases. Most bass, crappie, bluegill, carp, catfish, caddis fly.
Less than 68°F (cold water)	Upper range (55°F - 68°F)	Some plant life, some fish diseases. Salmon, trout. Stonefly, mayfly, caddis fly, water beetles, striders.
	Lower range (less than 55°F)	Trout, caddis fly, stonefly, mayfly.

TASK #4

Based on the aquatic animals you found, and the Analyzing Data Section passed out, predict the following characteristics of this stream:

I predict:

the water temperature will be_____because_____;

the air temperature will be_____because_____;

the pH number will be_____because_____;

the dissolved O_2 count will be_____because_____.

Keep these predictions for your own reference.

Topic: Stream Study #4
Subject areas: Science, Language Arts
Estimated Time: 45 minutes
Grade 5 or 6
PS

PRE - ACTIVITY (10 minutes)

Get into groups of 5 or 6.

Explain procedures for field testing, rules and boundaries.

Each group should go to a different part of the stream.

STREAM STUDY

Activity

ACTIVITY (20 minutes)

Do Task #5.

POST-ACTIVITY (10 - 15 minutes)

Come in and clean up equipment.

Have those groups cleaned up first, record the results of their tests on a chart that can be saved for the next day. Put chart on a large sheet of butcher paper.

LEVEL V OBJECTIVE

The student will be able to identify physical characteristics and composition of water such as temperature, mineral content, oxygen content, pH.

LEVEL VI OBJECTIVE

The student will know the non-living factors of a stream, such as water temperature, air temperature, oxygen content and pH.

MATERIALS

4 water test kits if possible (your school may have some, or borrow from a neighboring school or from the Administration Center).

15 air thermometers.

Task Cards #4 and #5.

TEACHER BACKGROUND INFORMATION

There are lots of jobs to be done in water testing (clipping, squirting, swirling, dipping, counting, etc.) so be sure everyone has a job. You may need to show students use of kit or names of different parts of kit before going out to field test. They can read directions and ask questions before going out.

RESOURCES AND CREDIT

Investigating Your Environment Series
U. S. Forest Service
Portland, Oregon

TASK #5

MAKE SURE EVERYONE IN YOUR GROUP GETS INVOLVED IN THE TESTING. Using the water test kit, determine the water temperature, air temperature, dissolved oxygen count, and pH of the stream.

Record the data below: (also record predictions from Task #4 to compare)

		Water Temperature		Air Temperature		pH		Useable O_2 (ppm)	
Location of water sample (edge or middle of stream)	Time Taken	My Pred.	Act. Test	My Pred.	Act. Test	My Pred.	Act. Test	My Pred.	Act. Test

Topic: Stream Study #5
Subject areas: Science,
Language Arts
Estimated Time:
25 minutes
Grade 5 or 6

PS

PRE - ACTIVITY (5 minutes)

Be sure all groups have charted their recordings from the day before. Let students look over charts.

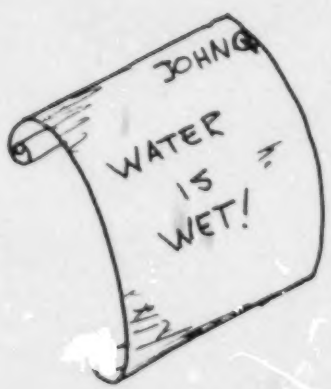
STREAM STUDY

Activity

ACTIVITY (20 minutes)

Begin questioning results:

1. What do you notice about the results charted?
2. Why might there be differences in results among groups?
3. How did your group's results compare with your predictions?
4. Is it necessary to have sophisticated equipment to determine temp., oxygen, pH, etc.?
5. Write a paragraph on what we can say about the quality of water in this stream, and other things we need to know to decide whether or not to drink this water



LEVEL V OBJECTIVE

The student will identify physical characteristics and composition of water such as temperature, mineral content, oxygen content, pH.

LEVEL VI OBJECTIVE

The student will know how to use a water test kit for testing pH, oxygen content, and water temperature.

Materials

MATERIALS

Task Card #5.

Chart on which data were recorded day before.

RESOURCES AND CREDIT

Investigating Your Environment Series
U. S. Forest Service
Portland, Oregon

Topic: Stream Study #6
Subject Areas: Science, Math
Estimated Time: 40 minutes
Grade 5 or 6

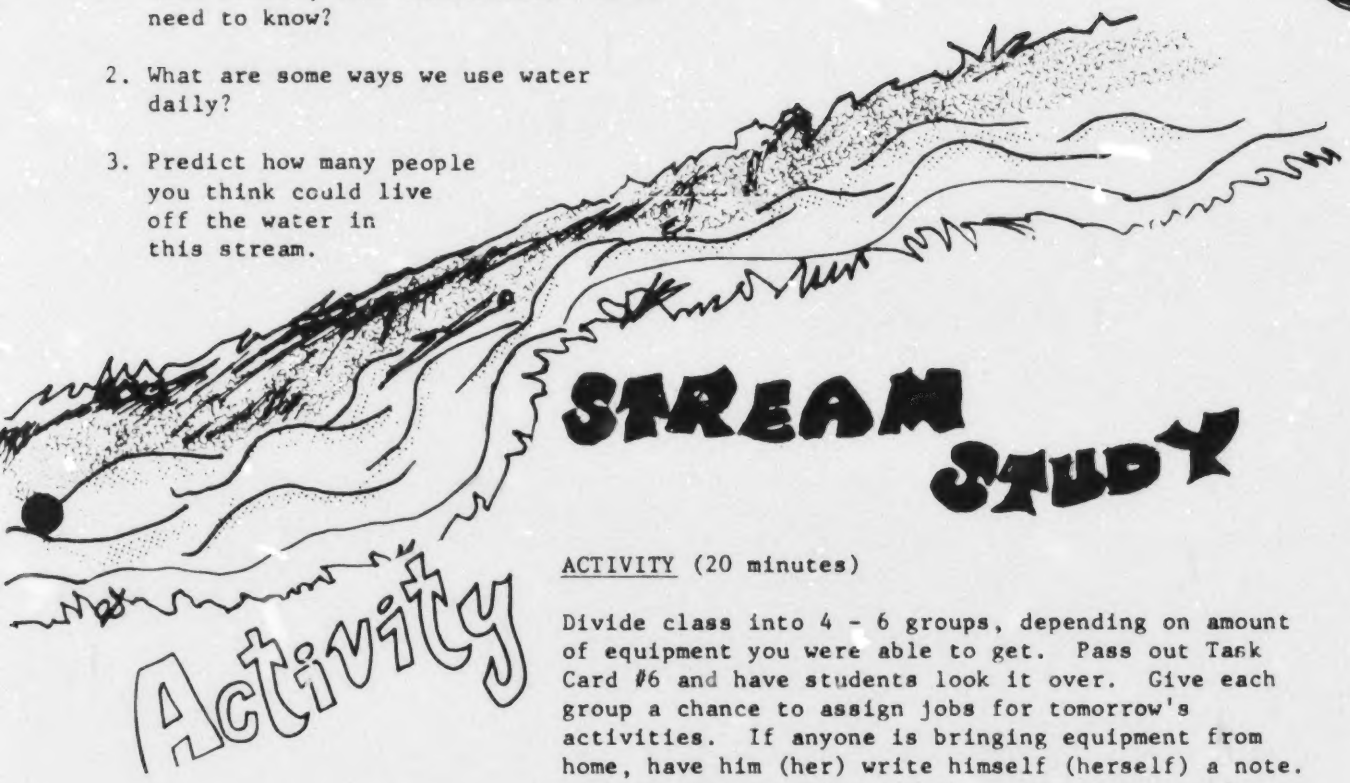
PRE - ACTIVITY (5 minutes)

Ask following questions:

1. If we want to know how much water is in this stream, what measurements do we need to know?

2. What are some ways we use water daily?

3. Predict how many people you think could live off the water in this stream.



STREAM STUDY

Activity

ACTIVITY (20 minutes)

Divide class into 4 - 6 groups, depending on amount of equipment you were able to get. Pass out Task Card #6 and have students look it over. Give each group a chance to assign jobs for tomorrow's activities. If anyone is bringing equipment from home, have him (her) write himself (herself) a note. You may need to collect task cards so they won't misplace them overnight. Jobs within the group could be::

- Measurer of 100'
- Stick dropper
- Width measurer
- Depth measurer
- Timer, etc.

Spread students out so they measure different 100' marks, if possible, and you could then average all your results in the end.

POST-ACTIVITY (15 minutes)

Go over one or two math problems on finding averages.

Go over a couple of problems on converting inches to feet.

Go over a couple of multiplication problems where one multiple is a decimal, for example:

$$\begin{array}{r} 7.43 \\ \times 73 \\ \hline \end{array}$$

This review will spark some of your math "aces" and make your final calculations easier.

LEVEL V OBJECTIVE

The student will understand how the structural and behavioral changes of plants and animals takes place.

LEVEL VI OBJECTIVE

The student will know the importance of pre-planning in carrying out an Environmental Education activity such as determining stream-flow.

MATERIALS

Task Card #6.

Yardstick or tape measure for each group.

Ping pong balls or small sticks that float, one for each group, plus spares.

3 or 4 watches with second hands, or stop watches.

Students will need boots and/or extra clothes and shoes.

TEACHER BACKGROUND - DETAILS

Today will be used for you to explain what will happen tomorrow, and for the students to get into groups and assign jobs and equipment needed. The Math for this, after you take the measurements, gets hard as you progress. You may want to get all the data and send it to the 6th grade to compute, or you can just help the students through it. The POST ACTIVITY gives some preliminary practice.

RESOURCES

Investigating Your Environment Series
U. S. Forest Service
Portland, Oregon

TASK #6 - DETERMINATION OF STREAMFLOW

Instructions for collecting and recording streamflow measurements.

a. Measure and mark a 100' distance along a straight section of your stream. If you can't find a straight 100' section, use 50' or 25'. Throw a stick 2 or 3 inches long into the water above the upstream marker. Record the number of seconds it takes to float downstream between the 2 markers. Now divide the distance by the number of seconds it took the stick to float between the markers:

_____' ÷ _____ = _____ ft./sec.
(distance) (# of seconds to float 100') (# ft. stick floated each second)

b. Find the average width of your section of the stream. Measure the width of the stream at 3 places within the 100' area. Divide the total by 3 to get the average width of the stream.

1st measurement: _____'
2nd measurement: _____'
3rd measurement: _____'

Total: _____' ÷ 3 = _____' (average width)

c. Find the average depth of your section of the stream. Measure the depth of the stream in at least 3 places in a straight line across the stream. Divide the total by 3 to get the average depth of the stream.

1st measurement: _____'
2nd measurement: _____'
3rd measurement: _____'

Total: _____' ÷ 3 = _____' (average depth)

d. Find the cubic feet of water per second. Multiply the average width by the average depth by the number of feet the stick floated each second. Remember that all 3 measurements must be in feet, or all 3 must be in inches. Don't multiply feet by inches.

Note: a cubic foot of water is the amount of water in a container 1' wide, 1' high, and 1' long, or 7.48 gallons.

_____ x _____ x _____ = _____
(average width) (average depth) (# of feet per second) (cubic feet of water flowing per second)

In order to find how many people could live from the water in this stream, complete the following calculations:

_____ x 7.48 = _____
(stream flow in cubic' per sec.) (gallons in 1 cubic' of water) (gallons of water per second)

_____ x 60 = _____
(gallons per second) (seconds in a minute) (gallons of water per second)

_____ x 1440 = _____
(gallons per minute) (minutes in a day) (gallons of water per day)

The average person uses about 200 gallons of water a day for home use. This does not include each person's share of the water used for industrial, public services, and commercial purposes.

_____ ÷ _____ = _____
(gallons per day) (amount of water one person uses per day) (total # of people who could live from water in this stream)

Topic: Stream Study #7
Subject Areas: Math, Science
Estimated Time:
50 minutes
Grade: 5 or 6

PS

PRE - ACTIVITY (10 minutes)

Review Task #6. Review procedure for gathering information. Be sure all groups have assigned all jobs. Check clothing.

STREAM STUDY

Activity

ACTIVITY (20 - 3- minutes)

Go out to site and collect data on Task #6.

POST-ACTIVITY (10 minutes)

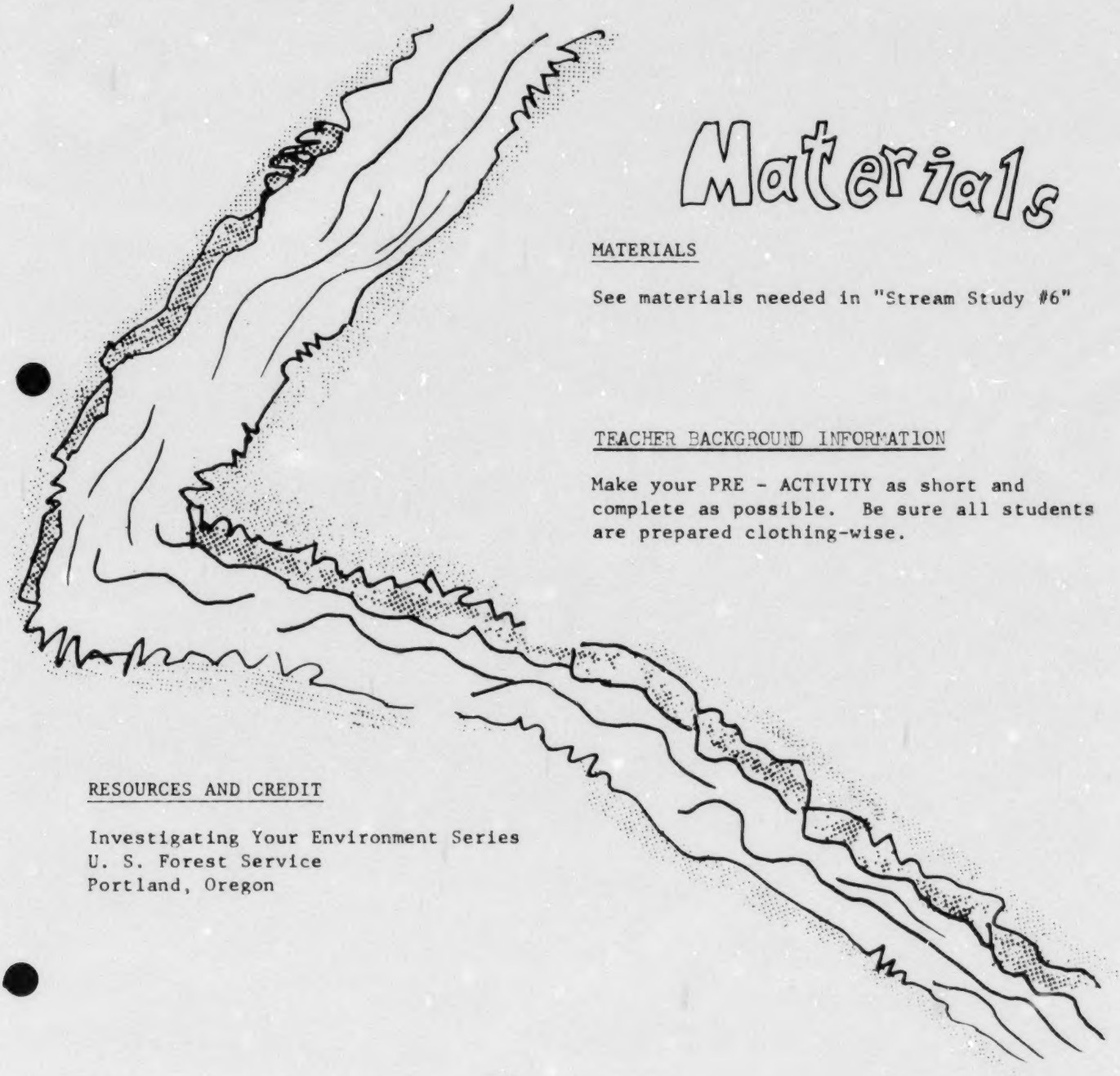
Come in, clean up, and change clothes if necessary.

LEVEL V OBJECTIVE

The student will understand some of the physical factors involved in land use decisions.

LEVEL VI OBJECTIVE

The student will know how to use a yardstick, stopwatch, and ping pong balls to measure water volume flow rates.



Materials

MATERIALS

See materials needed in "Stream Study #6"

TEACHER BACKGROUND INFORMATION

Make your PRE - ACTIVITY as short and complete as possible. Be sure all students are prepared clothing-wise.

RESOURCES AND CREDIT

Investigating Your Environment Series
U. S. Forest Service
Portland, Oregon

Topic: Stream Study #8
Subject Area: Math
Estimated Time:
40 minutes
Grade: 5 or 6

PS

STREAM STUDY

Activity

ACTIVITY (20 minutes)

Average the width and depth; find number of feet per second stick floats, etc., until you come up with total.

POST-ACTIVITY (20 minutes)

1. Check the total number of people against students' previous guesses. If you got more than one group's total, then average all groups.

2. How many people could live off the water in this stream?

3. What would happen to this environment if we piped all the water out of the stream at this point, and into the community?

4. If we are going to use this water, how much water should be left to flow down stream? Why?

5. Does this stream always have this amount of water in it? Why?

Do Task #7. Then ask the following questions:

1. What did you find out about water from our investigations today?

2. Why is water important to the ecosystem?

3. How can we summarize our discussions and investigations?

4. What methods and processes did we use in our investigations today?

LEVEL VI OBJECTIVE

The student will know that it is important to conserve water.

TASK #7 - Work by yourself.

1. Describe in writing how you feel about man's effect on the aquatic environment at this site:

_____

_____

_____

_____

2. Describe at least one action you can take in your everyday life to help improve the way water is managed:

   a) in your home: _____

   b) in your community: _____

   c) in your consumer habits: _____

3. Describe the benefits of each action in #2:

_____

_____

Topic: Stream Study #9a
Subject Areas: Art, Math
Estimated Time:
50 minutes
Grade: 5 or

STREAM STUDY

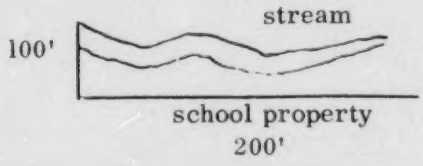
PRE - ACTIVITY (10 minutes)

Tell students: The principal wants some plans for developing the stream area. We'll break up into groups, and each group will plan a strategy for use of the school property bordering the stream. (Example: nature trail, picnic area, amphitheatre, etc.) Use all the data already collected and discussions already completed. Break into 5 or 6 groups.

Activity

ACTIVITY (20 minutes)

Each group goes out and maps stream area bordering school. Example:



POST ACTIVITY (20 minutes or more, depending on detail)

Come in and blow map up, or make a large model showing where all proposals will be placed in area. (Trails, benches, etc.) Same day or next day, group should plan what they are going to say to principal along with their visual display. The presenting of these proposals can be made as each group completes its own plans. Have them present plans to principal.

SUGGESTED ADDITIONAL ACTIVITIES

Present plans to other teachers, perhaps even a 6th grade and a 4th grade representative. Then implement the plan if possible.

MATERIALS

Clip boards
Pencils
Drawing paper
Large butcher paper
Felt pens
Materials for making models
(flour, water, etc.)

TEACHER'S BACKGROUND - DETAILS

You can use "Stream Study #9a" or "#9b" or both. You can use both after first study or second study, or one after each study. #9a will take a few days, by the time all presentations are made.

LEVEL V OBJECTIVE

1. The student will be able to identify environmental problems, especially in his own local environment.

2. The student will be able to demonstrate constructive and cooperative action in the maintenance or improvement of the local environment.

LEVEL VI OBJECTIVE

The student will know that without a plan or guideline, land can be wasted.

RESOURCES

Investigating Your Environment Series
U. S. Forest Service
Portland, Oregon

Topic: Stream Study #9b
Subject Areas: Creative Dramatics
Estimated Time: 55 minutes
Grades: 5 or 6

STREAM STUDY

PRE - ACTIVITY (20 minutes)

Divide class into 6 groups. Assign each group a role. Allot about 15 minutes for each group to make a presentation. Tell them they will give a 3 minute presentation. Try to include more than one speaker.

ACTIVITY (20 minutes)

3-minute presentations by various groups.

POST-ACTIVITY (10 - 15 minutes)

Board's presentation regarding their decision after they have had 5 minutes to decide. They must back up their decisions with reasons.

LEVEL V OBJECTIVE

The student will consider a specific environmental problem from many different viewpoints.

LEVEL VI OBJECTIVE

The student will know that there are diverse points of view held by different interest groups in land use planning.

Materials

MATERIALS

Fact sheet concerning statements of interest groups.

TEACHER BACKGROUND - DETAILS

This simulation game can be used at the end of the first stream study, or, hopefully, it will be used after the second stream study in the spring so there will be more data to use.

RESOURCES

Investigating Your Environment Series
U. S. Forest Service
Portland, Oregon

"FACT" SHEET ON VARIOUS INTEREST GROUPS

Blue Water District:

Would like to construct a reservoir, and in doing so might need to re-channel the stream.

Rocky-Reach Park Department:

Re-channelling the stream would stir up silt that would affect the fish life for a couple of years. How would they take care of the erosion problem that would occur?

Wailing Water Elementary School:

They would lose a study site, there would be no more after school model sailing club, and the picnic area and amphitheatre would lose their scenic value.

Blue Ridge Homeowner:

The stream going through some back yards would be dried up by the rechannel, and that is why they bought in the area. Their property value would go down. Also, they don't want the reservoir tank spoiling their view, or the noisy construction going on.

Flim-Flam Construction Company:

They own all the property which the re-channel would go through. They wouldn't have to lay off 20 employees because they could build higher-class homes on their property, since people will buy more expensive homes if there is a stream on the property.

Blue-Rock City Planning Board:

Overall decision-makers base their decisions on the arguments of the other groups. This group decides on 5 things they will rate the speakers on for the purpose of making their decision. (Examples: Economics, Environmental impact, Community service, etc.)

TEACHING CHILDREN OUTDOORS

Guidelines for Conducting a Field Trip

I. PRE-TRIP

A. LOGISTICS

PREPARING TO USE AN ENVIRONMENTAL STUDY AREA

Visit the site yourself first in order to have the best control of the situation and anticipate some of the difficulties or logistics questions that could arise. Examine the area carefully and know your trails. This one step can make the difference between a successful and a chaotic trip.

Is there room for your thirty active children? Are there problems of access? Will the children be able to see? You should obtain permission in advance if you plan to bring your class into a private area.

Organization and planning is essential. How far is it? How long will it take? What is needed (water, lunch, other equipment)?

RULES AND RESPONSIBILITIES

Before the trip, have the children join you in deciding on a set of rules and conduct based on the suggestions listed under the Activity Section. Try to keep the rules "do" rather than "do not." They should include most of the following:

1. Always keep the teacher within sight and sound.
2. Stay behind the leader and at a sufficiently safe distance from one another and dangerous areas. (Proper distance can be measured safely and conveniently by the students in terms of "body length.")
3. Always watch and listen for the teacher's signal to pay attention and gather together.
4. Try to leave the place in as good, or better condition, than you found it. Replace everything you move. Avoid stepping on plants and animals whenever possible.

PREPARE FOR EMERGENCIES

1. What are the health and safety hazards? Include a First Aid Kit and water, if necessary.
2. Remind students to dress properly for the weather and type of activity planned (e.g. hats, raincoats, wading boots, etc.)
3. Children should be warned that they are to avoid picking up any plant or animal about which they are in doubt (see guidelines for collecting specimens). Students should not taste or eat anything without first checking with the leader.
4. If you teach in an area where there are poisonous plants, snakes or insects, be sure that you and the children recognize the poisonous

4. (continued) species. Then they should also know poison ivy, poison oak and poison sumac and avoid them.

USE OF ASSISTANTS OR PARAPROFESSIONAL AIDES

1. High School Teachers' Aides: If you have a high school teacher aide, why not divide your class in half and plan together to let him/her help in certain phases of teaching outdoors (within sight and sound of your supervision).

   More information about the availability and assignment of high school student teachers' aides for classwork and or field trips may be obtained from the high school Counseling Office in each high school.

2. Intermediate and Junior High School Students: Depending on the time and difficulty of your particular outdoor activity, you can depend upon junior high and even intermediate students to conduct simple 10-15 minute exercises outdoors with small groups of younger students. It is mutually beneficial if properly planned and supervised. Contact the Counseling Office in each school for aides.

3. Parents: Find a parent who is willing to assume an active role in assisting you with learning activities outdoors.

   Also, why not organize parent work parties after school to improve outdoor laboratories for learning on or near elementary school sites?

4. Docent Aide Programs of Community Organizations: For further information, contact your school district's Coordinator of Community Volunteers.

B. LESSON PLANNING

AREAS AVAILABLE FOR USE

A. School Site: Your own school site is rich in opportunities for environmental observation, learning, beautification, and improvement.

When you have seen your own school site, why not schedule a field trip to another school site?

B. Neighborhood Parks: Check your city map and plan a hike to the nearest park or public natural area. What are its unique characteristics and experiences for learning?

C. Special Attractions: Included here are areas such as Marshall Outdoor Laboratory, Chase Lake Bog, State and National Parks and Forests and other public or private areas permitting your use for education.

PREPARE THE GROUP IN ADVANCE

Where to Go

The first prerequisite for a site is that it provide what you want the children to see or do. The closer it is and the easier it is to get to, the better.

First, the teacher must become acquainted with the descriptive features of the area and with its significance. But you should go beyond merely identifying the flora and fauna or the outstanding physical features of the facility. You should take a close, analytical look around the site and decide which of its characteristics are relevant to people and environmental education in terms of your subject or discipline.

When you find something interesting, tie a piece of yarn near to it to help you find it when you want to show it to the rest of the class.

A. Motivation: Discuss the purpose of the trip with the class beforehand. If the children don't know what to look for, they will become bored and restless quickly. If they are absorbed in a problem, they may maintain interest for a long time. You should know what you want the children to look for before you start out, even if it is stated in only the most general terms.

Be prepared to cover at least some of the field trip objectives given to you by your group during your planning sessions.

B. Materials: Take as little as possible with you; the less equipment, the better. What you decide to take depends on the purpose of the trip. You may want the children to have pencils and notepads. Pieces of yarn can serve as markers for interesting discoveries made by the children. Magnifiers, maps or compasses may be very useful, but you risk loss or damage.

If you want to have them along, take as few as you can and put each one in the specific care of a responsible child.

If you intend to collect specimens, you will need appropriate equipment such as plastic bags,etc. You may also want to carry a camera. Collecting on the site is done only with special permission and is generally discouraged; therefore, bottles, nets, traps,

or other cumbersome and often dangerous paraphernalia should be left at home. Students saddled with the responsibility of comprehensive notetaking or with long checklists of things to observe, are often so busy recording and searching for specifics that they rarely get the big environmental picture.

Reference materials to aid in identification are handy, but not so essential that the expedition be weighted down with them.

The on-site experience should be primarily observational. Work best accomplished in the classroom, such as research, calculations, and more academic studies, should not be attempted at the environmental study area, but rather left to the post-site lessons back in the classroom.

The best guides as to what to take along are the activities most suited to the site and the subjects to be studied there. 1) If the on-site experience is to include identification of objects, the pre-site studies should include enough information so that the students know what to look for. 2) If, on the other hand, the on-site experience is to allow the students the excitement of making discoveries, there should be enough guidance - in the form of pertinent questions - to direct their observations toward the given goal. 3) When the environment is to be used as a vehicle for discussion, as in a social science field study, there should be a predetermined understanding of what environmental on-site observations will best motivate the students.

4) A research trip, though open-ended and allowing students a great deal of freedom, should have specific learning objectives.

II. ACTIVITY

A. LOGISTICS

1. Review your student-made rules and define your boundaries with easily recognized landmarks.

2. Explain that this is an outdoor classroom, and that the students should act like students.

3. Ask students to go to the restrooms and get a drink of water before the trip starts.

4. Explain that you will raise your hand to get the group's attention while on the trail. This should serve as an automatic signal for them to stop where they are and remain quiet.

5. When students see or hear the established signal, they should immediately gather around the teacher or in a semi-circle around a point of interest.

6. Whistles are disturbing to children, other groups, and wildlife and should not be used except in an emergency when everyone is called to assemble and return to the school at once. In such a case, the children should be taught to recognize one internationally accepted signal for distress, which is three short blasts on a whistle.

7. There are occasions, depending on the nature of the trip, when the "Buddy System" works just as well on field trips as at the waterfront.

8. Before leaving, have students count off. Before returning from the field, count off again.

9. The teacher or another adult who is familiar with the area should lead the group. Any other arrangement must remain in control (sight and sound) of the adult leader at all times.

10. It is most essential to have a responsible person at the rear at all times.

11. Have students play follow the leader, in single file, when you want to arrange them in a semi-circle around a particular point of interest.

12. Be quiet and move slowly so that you do not disturb the creatures that live there.

13. Watch the length of the line. Don't make the trip a marathon. Move out rapidly at first, and then proceed according to the group's ability. Pace is determined by the slowest walker. Don't make walking a chore. Change the speed of your pace occasionally. It helps to maintain interest.

14. Always remember to stay on the trail, watch your feet, display good outdoor manners and practice good conservation.

15. Keep stops short. When choosing resting places, try to find an interesting site to accommodate the group: A hilltop or hillside with a panoramic view; a stream or lake side; beside a gravel pit; at the dooryard of an abandoned farm;

15. (continued)
at the edge of a forest. Avoid poisonous plants. While resting, check on the condition of your students, as well as cameras, compasses, sketch pads, and exchange of information.

16. Try a different route if a return trip to the starting point is necessary. It helps to keep up interest.

17. Conclude the trip on an interesting note.

B. LESSON PLANNING

TEACHING TECHNIQUES

1. Involve the group actively during the trip as much as possible. Emphasis should be placed on doing. Look for things you have talked about. Emphasize self discovery. Allow time for free exploration. Encourage individual curiosity, investigation and sharing of discoveries with the rest of the group. Encourage use of all five senses whenever possible. Encourage the children to taste, smell, hear and see.

2. Avoid talking about something while on the trail until the entire group has caught up and you have their attention. If possible, try to get the group around you before you start talking.

3. Project your voice. Lift chin up and talk up and over those in front, when the group cannot gather around you but is strung out in a long line. Direct your voice to the last person in the line.

4. Watch your vocabulary, especially natural history and conservation jargon which may be new to the children.

5. Avoid identification for its own sake. Identification and uses of plants and materials helps, but it is not necessary to be a walking encyclopedia. Even Indians did not know all of the oaks, but they knew which acorns were good to eat.

6. Repeat out loud questions directed to you from the group so that everyone hears the question.

7. Talk conversationally. Lecture as little as possible. Ask leading questions to stimulate participation. Answer a child's question with a question which will guide him toward giving the correct answer himself. Don't, however, belabor this technique. Don't bluff. If you can't answer the question, say so, then suggest that the student investigate the resources for an answer.

8. Make it exciting. Be enthusiastic even over something you have noticed before. Remember, to the group it is new. Maintain a feeling of adventuring. Remember that there can be a significant difference between excitement and learning. Excitement should be delicately channeled toward interest. If you become the eyes and ears of your inexperienced charges, you will soon find that your sensitized students will serve as additional eyes and ears for you. They will call to your attention things that you would ordinarily overlook.

9. Prepare for surprises. Take advantage of teachable moments! If a child discovers something exciting, stop what you are doing, if possible, even if what the child wants to share with the group has little or nothing to do with whatever subject you are covering, and allow him to talk about his discovery. You can direct the group's attention back to your subject later. Use tact in keeping the students' facts straight to avoid discouraging self-expression. Avoid getting off on a tangent for very long, unless you all agree that a new study area is more important than the original purpose of the trip.

9. (continued)
So many things that can initiate learning out-of-doors are sometimes overlooked - buds on twigs, a bird with something in its beak, an ant dragging a caterpillar along the ground, the direction in which dandelion fluff is blowing, the position and phase of the daytime moon.

Any single observation can be the beginning of exciting exploration and lead to the joy of further discovery.

Every observation leads to a question: What is inside buds? Why doesn't the bird swallow the worm in its beak? Where is the ant going with the caterpillar? What happens to the dandelion seeds after they blow away?

The most interesting questions are questions that do not have neat, precise answers, but this should not prevent your investigating them anyway. The out-of-doors is so full of interacting things, that answers are always new and interesting and different.

10. Collecting Specimens: The field trip may lay the groundwork for activities you will want to do in the classroom. Collect only those things as are absolutely necessary for such follow-up, because it is important that the children learn good conservation habits.

The basic rule is to leave a natural habitat undisturbed. Replace anything you move. Avoid stepping on plants or animals whenever possible. If an animal is caught and observed, it should be put back where it was found - allowed to "go home."

The field trip should be distinguished from a collecting expedition, which would be better carried out by you alone or with a few selected students.

Make all collections in accordance with the law or other prescribed regulations, and try to leave the place in as good, or better, condition than you found it.

III. POST-ACTIVITY

AFTER THE TRIP - LET THE MEMORY LINGER ON

Some leaders like to have group evaluations before a trip is concluded, or at a later time. In some instances, an evaluation is not necessary.

CREDITS

LEADING CHILDREN IN THE FIELD, U.S. Forest Service, R-6, Portland, Oregon. PUTTING CONSERVATION TO WORK, Teaching Aid #4, August 1965.

MAN AND HIS ENVIRONMENT "Preparing to Use the Environmental Study Area," pps. 16-20, National Education Association, 1970.

LIVING THINGS IN FIELD AND CLASSROOM, "Planning Any Type of Trip," pps. 97-99, Minnesota Math and Science Teaching Project, University of Minnesota, copyright 1969.

SUGGESTIONS FOR OUTDOOR FIELD TRIPS Ernest V. Blohm, Executive Secretary, Michigan Interagency Council for Recreation, Lansing Michigan, April 19, 1966.

TIPS FOR TRAIL LEADERS
Charles Holtzer, Consultant,
Conservation and Outdoor Education,
Colorado Dept. of Education,
September 1968.

RESOURCES, BACKGROUND INFORMATION,

AND SPEAKERS

DEPARTMENT OF ENVIRONMENTAL HEALTH
University of Washington (543-3620)
Tours of facilities for all grade levels.

U.S FOREST SERVICE
Pacific N.W. Region (R-6)
Motion picture films available in Region 6 library, available on loan for educational purposes to schools, civic groups, churches.
Write to: WASHINGTON STATE FILM LIBRARY
Olympia, Wash. 98504 (206-753-3390)

DEPARTMENT OF CIVIL ENGINEERING: Air and Waste Quality Control
University of Washington
Tours and information.

EDMONDS RECREATION AND PARKS
Subject: Park Acquisition and/or Development
Rod Garretson, Dept. Director
Subject: Park Management
Rod Garretson or Don Burton, Park Superintendent
Subject: Recreation Program - Correct Park Usage, etc.
Doug Schafer, Recreation Supervisor

SNOHOMISH COUNTY PUD
Subject: Energy
Dick Downie, Environmental Coordinator
Don Rider, Public Relations

SNOHOMISH COUNTY HEALTH DEPARTMENT
Subject: Nursing
Ann Wilson, Kathy Carrol (259-9386)
Subject: Environmental Health
Sewage - Charles Mangum (259-9473)
Food Programs - includes restaurants, bakeries, itinerant food (circuses, carnivals, etc.), meat markets.
School, Solid Waste, Camping Areas, Mobile Home Courts, Chemical and Physical Health Hazards Unit, Rodent Control - Byron Robertson (259-9499)
Water and Noise - Gary Fraser (259-9499)
Epidemiology Unit - Dr. Luke (259-9473)
V.D. Section

THE INSTRUCTOR PUBLICATIONS, INC.
Subject: Ecology Posters #750
Dansville, NY 14437

WASHINGTON LUNG ASSOCIATION
216 Broadway East
Seattle, WA 98102
Contact: Mr. David L. Chivers, Regional Program Director
For: "Our Polluted Air" Mobile Workshop (one month in advance), various air pollution pamphlets and health information, films also available on request.

EDUCATIONAL SERVICES CENTER
Bill Hamilton (778-8965) or John McAdam (778-8658)
Information and resources

SEATTLE AUDUBON SOCIETY
712 Joshua Green Bldg.
Seattle, WA 98101 (622-6695)

FILMS

Numbers in parentheses immediately following titles indicate lengths of film in minutes. C for color; BW for black and white.

Conservation

A MATTER OF TIME	Conservation Foundation 30 East 40th Street New York, N.Y.
PARADISE POLLUTED	Roy Wilcox Productions 301 Allen Hill Meriden, Conn.
THE PERSISTENT SEED	National Film Board of Canada Canadian Embassy 1746 Mass. Ave. NW Washington, D.C. 20036
WITH EACH BREATH	New York State Air Pollution Control Board 84 Holland Avenue Albany, N.Y.

CONSERVATION AND BALANCE IN NATURE	International Film Bureau 332 South Michigan Avenue Chicago, Ill. 60604
OUR CHANGING ENVIRONMENT	Encyclopedia Britannica Films, Inc. 1150 Wilmett Avenue Wilmett, Ill.
SO LITTLE TIME	USDI Sport Fisheries and Wildlife 710 N.E. Holladay Portland, Oregon
TOWARDS TOMORROW	BBC through British Embassy Washington, D.C.
3 YOUNG AMERICANS IN SEARCH OF SURVIVAL	3M Company Television Production
WILD RIVERS (28)	Modern Talking Picture Service 1212 Avenue of the Americas New York, N.Y. 10036
CLEAN WATERS (20) Free	U.S. Public Health Service Audiovisual Facility Chamblee, Georgia 30005
NATURE'S PLAN (14) $6.00	Encyclopedia Britannica Films 202 East 44th Street New York, N.Y. 10017
IT'S YOUR DECISION - CLEAN WATER (14 1/2)	Association Films 600 Grand Avenue Ridgfield, N.J. 07657
THE RIVER MUST LIVE (21) Free	Shell Oil Company, Film Library 450 North Meridan Indianapolis, Ind. 46204
TROUBLED WATERS (28) Free	U.S. Senate Public Works Committee Room 4204, New Senate Office Bldg. Washington, D.C. 20510
GREAT LAKES INVADER, THE SEA LAMPREY (13 1/2) Free	Bureau of Sport Fisheries and Wildlife 1002 N.E. Holladay Street Portland, Oregon
THE WHOOPING CRANE (14) Free	Bureau of Sport Fisheries and Wildlife

NATIONAL PARKS, OUR AMERICAN HERITAGE (17-c)	Seattle Public Library 4th and Madison Seattle, Wash. 98104
RETURN OF THE BUFFALO (10-BW)	Seattle Public Library
WOODLAND MANNERS (19-C)	Seattle Public Library
LIFE ON THE WESTERN MARSHES (15-C)	Seattle Public Library
LET'S KEEP AMERICA BEAUTIFUL (18-C) $1.50	Richfield Oil Company P.O. Box 75007 Sanford Station, Los Angeles, Calif.
WINGS OVER BLITZEN (39-C)	Bureau of Sport Fisheries and Wildlife 730 N.E. Pacific Street Portland, Oregon 97208

Most of the following films on conservation are available to teachers through their school district, or to anyone through Rarig's Inc., Audio-Visual Sales and Service, 2100 North 45th, Seattle, Wash.

CONSERVATION (10-BW)
TOPSOIL (10-C)
CASCADE MOUNTAINS (20-C)
WATER-FOUNTAIN OF LIFE (30-C)
WATER CONSERVATION (11-BW)
WHAT MAKES RAIN? (10-BW)
CONSERVING OUR NATURAL RESOURCES (18-C)
UNTOUCHED LAND (30-C)
LITTERBUG (8)
CITIES AND SUBURBS: METROPOLITAN (9-C)

Ecology and Enjoyment of Nature

The following films are free of charge. Write Conservation Film Center, P.O. Box 9163, Seattle, Wash. 98119

LIVING RIVER - GRAND CANYON (29-C)
WILDERNESS ALPS OF STEHEKIN (30-C)
GLACIER PEAK HOLIDAY (30-C)
BULLDOZED AMERICA (27-BW)
NORTH CASCADES (35 mm slide show with script)
THE REDWOODS (20-C)
THE MYTHS AND THE PARALLELS (27-BW)
BEACH HIKE (17-C)
TWO YOSEMITES (10-C)
GLEN CANYON (28-C)
WASTED WOODS (15-C)
HELLS CANYON (33 mm slide show with script)

Most of the following films on ecology and enjoyment of nature are available to teachers through their school district or to anyone through Rarig's Inc., Audio-Visual Sales and Service, 2100 North 45th, Seattle,Wash.

THE SEA (26-C)
WORLDS OF DR. VISHNIAC (C)
COLUMBIA FRONTIER (27-C)
WORLD OF LITTLE THINGS (C)
BALANCE OF NATURE (17-C)
WHAT PLANTS NEED FOR GROWTH (10-C)
ECOLOGY (24-C)
LIFE STORY OF THE OYSTER (11-C)
DISTRIBUTION OF PLANTS AND ANIMALS (16-C)
PLANKTON, PASTURES OF THE OCEAN (10-C)
ANIMAL WAR-ANIMAL PEACE (27-C)
OUR MISTER SUN (60-C)
FATHER OCEAN (10-C)
WHY PLANTS GROW WHERE THEY DO (11-C)
CANOEING THE BIG COUNTRY (14-C)
DESERT COMMUNITY (12-C)

YELLOWSTONE: OUR FIRST NATIONAL PARK (15-C)
GRASS BLADE JUNGLE (11-C)
HERITAGE OF SPLENDOR (16-C)
AROUND THE BIG LAKE (17-C)
TRAIL RIDE (20-C)
LIFE IN THE OCEAN (11-C)
SPRING (9-C)
LIFE ON A DEAD TREE (11-C)
CONSERVATION: JOBS FOR YOUNG AMERICA (19-C)
LIFE IN THE OCEAN (11-C)
ANIMALS THAT LIVE IN THE SURF (11-C)
MARSH COMMUNITY (11-C)
THE DESERT (10-C)
ANIMAL LIFE AT LOW TIDE (11-C)
SPRING COMES TO A POND (13-C)
CAVE COMMUNITY (13-C)

WAY OF LIFE (Illustrates predatory tendencies of nearly all animals)	Wash. State Game Dept. 600 N. Capital Way Olympia, Wash. 98501
WILDERNESS TRAIL (14-C)	U.S. Forest Service Regional Office P.O. Box 4137 Portland, Oregon
WILDERNESS ENCAMPMENT (27-C)	U.S. Forest Service Regional Office
NATURE NEXT DOOR (28-C)	Sierra Club 1050 Mills Tower San Francisco, Calif.
AN ISLAND IN TIME (28-C)	Sierra Club
THE GREAT SWAMP (30-C) (Documentary of a national wildlife refuge)	Bureau of Sport Fisheries and Wildlife Office of Regional Director 730 N.E. Pacific Street, P.O. Box 3737 Portland, Oregon
PATTERNS OF THE WILD (27 1/2-C) (Shows that the wildlife of a forest does not merely live in a forest, but as a part of it.)	Bureau of Sports Fisheries and Wildlife
BIRDS AND THEIR MIGRATION (18-C)	Bureau of Sports Fisheries and Wildlife

FOR THE PEOPLE - WILDLIFE REFUGE (22 1/2-C)	Bureau of Sport Fisheries and Wildlife
GREAT BLUE HERON AND THE SNOWY WHITE EGRET (15-C)	Bureau of Sport Fisheries and Wildlife
KNOW THE HAWKS (10 1/4-C)	Bureau of Sport Fisheries and Wildlife
OUR MAGIC LAND (12 1/2-C) (For primary)	Bureau of Sport Fisheries and Wildlife
WATER BIRDS (22 1/2-C) Walt Disney	Bureau of Sport Fisheries and Wildlife

The following films can be rented from National Audubon Society, 1130 Fifth Avenue, New York, N.Y. 10028. Prices range from $5.00 to $11.00. All are 16 mm sound films.

THE BALD EAGLE, OUR NATIONAL BIRD (35-C)
BEAVER VALLEY (32-C)
BIRDS OF THE COUNTRYSIDE (11-C)
BIRDS OF THE DOORYARD (11-C)
THE GOONEY BIRD (20-C)
ISLAND IN DANGER (25-C)
ISLANDS OF GREEN (24-C)
KENTUCKY'S FEATHERED RAINBOW (28-C)
LOOK DOWN (55-C)
A James W. Wilkie Film
THE LOON'S NECKLACE (11-C)
NATURE'S HALF ACRE (33-C)
POISONS, PESTS AND PEOPLE (55-BW)
THE TOUCH OF NATURE (54-C)
THE WINDOW (17-C)
THE WOOD DUCKS WORLD (30-C)
YOUR LIVING HERITAGE (12-C)
VILLAGE BENEATH THE SEA (90-C) ($50.00)

The following 16 mm films must be used in a sound projector. Massachusetts Audubon Society, South Great Road, Lincoln, Mass. 01773.

BEARGRASS GREEK (20-C)
BEAVER DAM (16-C)
GREEN CITY (30-C)
LAND OF THE PRAIRIE DUCK(25-C)
LIFE IN A TROUT STREAM (10-C)
LIFE IN THE WOODLOT (17-C)
MARSHLAND IS NOT WASTELAND (14-C)
OUR WILDLIFF HERITAGE (30-C)
POPULATION ECOLOGY (19-C)
SILENT SPRING OF RACHEL CARSON (57-BW)
THEIR HERITAGE (20-C) Free
WORLD IN A MARSH (23-C)
YOURS FOR A SONG (14-C)

The following films are available from the Seattle Public Library, Main Branch; free upon request.

AMERICA'S LAST FRONTIER (13-C)
LAND OF THE RED GOAT
OLYMPIC RAIN FOREST (10-C)
BETWEEN THE TIDES (20-C)
ALPINE WILDFLOWERS (11-C)
EDIBLE PLANTS OF FIELD AND FOREST (24-C)
FAMILY AFOOT IN THE YUKON (22-C)
MT. RAINER NATIONAL PARK (20-C)
ANIMALS OF ALASKA (11-C)
MARINE ANIMALS OF THE OPEN COAST (22-C)
CONIFER TREES OF THE PACIFIC N.W. (16-C)

FREE AND INEXPENSIVE MATERIALS

The following are good sources for free or low cost informational materials on Population, Conservation and Ecology. Write for information about available materials.

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN
2401 Virginia Avenue, N.W.
Washington D.C. 20037
Resource directory on pollution control - 75¢.
Anti-pollution pamphlets and study guide - 75¢.

AMERICAN FORESTRY ASSOCIATION
919 17th Street N.W.
Washington, D.C. 20006
Pamphlets and bulletins. "You Can Be a Conservationist" by O.E. Randall.

CLEAN WATER
Washington, D.C. 20242
Suggestions about what communities can do to combat water pollution. Free.

CONSERVATION FOUNDATION
1250 Connecticut Avenue N.W.
Washington, D.C. 20036
Variety of pamphlets and articles dealing with the many aspects of ecology.

ENVIRONMENT MAGAZINE
438 North Skinker
St. Louis, Missouri 63130
Monthly publication dealing with effects of technology on the environment, published by Committee for Environmental Information. Student subscription - $5.00 per year.

INTERSTATE PRINTERS AND PUBLISHERS
Danville, Illinois 61832
Bibliography of books and other teaching materials in conservation field.

ISAAC WALTON LEAGUE OF AMERICA
1326 Waukegan Road
Glenview, Illinois 60025
"Clean Water - It's Up to You," excellent pamphlet on what local citizens can do about water pollution. Free. Monthly conservation newsletter.

LOCAL TUBERCULOSIS AND RESPIRATORY DISEASE ASSOCIATIONS
"Air Pollution Primer"

NATIONAL PARKS ASSOCIATION
1701 18th Street N.W.
Washington, D.C. 20036
Free or low-cost pamphlets and articles on thermal pollution, noise pollution, pesticides, and basic ecology. Excellent.

NATIONAL WILDLIFE FEDERATION
1412 16th Street N.W.
Washington, D.C. 20036
Conservation Directory - a guide to all state and national sources of conservation and environment information. $1.50. Informational packets on ecology and pollution - special packets from elementary to adult level. Excellent. Monthly newsletter.

PLANNED PARENTHOOD, WORLD POPULATION
515 Madison Avenue
New York, N.Y. 10022
Bibliography, film guide and following reprints: "Eco-Catastrophe," by P. Ehrlich; "300 Million Americans Would be Wrong," by D. Lilienthal; "The Human Race Has Maybe 35 Years Left,: by D. Lyle.

POPULATION REFERENCE BUREAU
1955 Massachusetts Avenue N.W.
Washington, D.C. 20036
Good bibliography, source list, and film guide on population. Minimal cost.

PORTLAND CENTER FOR CONTINUING EDUCATION
P.O. Box 1491
Portland, Oregon 97207
Attn: Mr. Lawless
"Observing our Environment, " - $3.00, relating elementary students to our environment.

PROJECT MAN'S ENVIRONMENT
National Education Association
1201 16th Street N.W.
Washington, D.C. 20036
Information on curriculum (K thru 12) environmental study areas.

PUBLIC AFFAIRS INFORMATION SERVICE
U.S. Government Printing Office
Washington, D.C. 20401

PUBLIC AFFAIRS PAMPHLETS
381 Park Avenue South
New York, N.Y. 10016
Pamphlet #421 - "An Environment Fit for People" - 25¢
#403 - "The Battle for Clean Air" - 25¢

SIERRA CLUB
Mills Tower
San Francisco, Calif. 94104
List of publications, pollution, population information, protection of scenic areas.

SUPERINTENDENT OF DOCUMENTS
Government Printing Office
Washington, D.C. 20402
"No Laughing Matter" - book of syndicated cartoons on air and water pollution (70¢). "Primer on Waste Water Treatment" - current and possible future methods of treating sewage and industrial waste (55¢). "Showdown" - picture pamphlet discussing "showdown" for water quality (65¢). "From Sea to Shining Sea" - presentation of environmental situation of U.S. with good bibliography, film list, and resource guide ($2.50).

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Public Health Service
Bureau of Disease Prevention and Environmental Control
Washington, D.C. 20201

U.S. GOVERNMENT PRINTING OFFICE
Washington, D.C. 20401
Bureau of Census; Bureau of Indian Affairs; Bureau of Land Management; Bureau of Reclamation; Department of Agriculture; Department of Health, Education and Welfare; Department of the Interior; Forest Service; National Park Service; Office of Education; Soil Conservation Service.

WILDERNESS SOCIETY
729 15th Street N.W.
Washington, D.C. 20005
Reports, pamphlets, reprints on preservation and use of our natural heritage.

ZERO POPULATION GROWTH
367 State Street N.W.
Los Altos, Calif. 94022
Newsletters, brochures, ecology leaflets, reprints.

You may also write to your local:
- Chamber of Commerce
- Historical Societies
- Preservation Societies
- State Offices
- State Office of Public Instruction
- State Offices:
  - Agencies of Pollution, Bureau of Fisheries, Fish and Wildlife Service, Wildlife Commission.

PAMPHLETS AND OTHER PUBLICATIONS

A CONSERVATION HANDBOOK - 50¢ Ordway, Samuel H., Jr.	The Conservation Foundation, 1949 New York
OBJECTIVES AND CONTENT OF CONSERVATION EDUCATION FOR AMERICAN YOUTH - 50¢	U. Press, Ohio State University, 1950, Columbus Ohio
MATERIALS FOR TEACHING CONSERVATION AND RESOURCE USE - 35¢	National Assoc. Biology Teachers, Interstate Printers and Pub., Danville Illinois.
RESOURCES FOR A GROWING POPULTION, Seaton, Fred - 25¢	Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C.
THE GLORY TRAIL - One copy free Swift, Ernest	The National Wildlife Federation 1412 16th St. N.W. Washington, D.C. 20036
THE PACIFIC NORTHWEST - $1 Zim, Herbert S.	Golden Press, New York
THE CONSERVATION OF OUR NATURAL RESOURCES, Seaton, Fred - 20¢	Conservation Bulletin 3-9, Supt. of Documents, above
CAREERS FOR WOMEN IN CONSERVATION - Free	U.S. Dept. of Labor, Leaflet 50, Women's Bureau, Washington, D.C.
WATER AND OUR FORESTS AIB-71 - 10¢	U.S. Dept. of Agriculture Forest Service, Washington, D.C.
FORESTS AND THE NATURAL WATER CYCLE K-1 - Free	U.S. Dept. of Agriculture
FOREST AND WATER 0-28 - Free	U.S. Dept. of Agriculture
HOW A TREE GROWS (16 x 12 poster) - 10¢	U.S. Dept. of Agriculture

FOREST REGIONS OF THE U.S.	U.S. Dept. of Agriculture
BIRDS, CN-1 - Free (There is a series of conservation notes number CN-1 through CN-21 available for education.)	Bureau of Sport Fisheries and Wildlife Dept. of Interior Washington, D.C. 20240
ENDANGERED WILDLIFE SERIES - Free (Numbered EWS-1 through EWS-5)	Bureau of Sport Fisheries and Wildlife
SOMETHING ABOUT HAWKS, SA-2 - Free	Bureau of Sport Fisheries and Wildlife
TREES OF WASHINGTON - Free (Extension Bulletin #440)	Cooperative Extension Service College of Agriculture Washington State University Pullman, Wash.
OFF ON THE RIGHT FOOT (A guide to proper wilderness use)	The Wilderness Society 729 15th Street N.W. Washington, D.C. 20005
ACTION FOR CLEAN WATER	The Wilderness Society
THE NEW CONSERVATION	The Wilderness Society
NEW CHALLENGES FOR WILDERNESS CONSERVATIONISTS	The Wilderness Society
A NEW LOOK AT OUR CROWDED WORLD Stewart, Maxwell, #393 - 30¢	Public Affairs Supt. of Documents U.S. Government Printing Office Washington, D.C.
PROGRESS IN THE PREVENTION AND CONTROL OF AIR POLLUTION - 30¢	Public Affairs
VEGETATION OF OREGON AND WASHINGTON (PNW Circular #80) - Free	Pacific N.W. Forest and Range Experimental Station P.O. Box 3141 Portland, Oregon 97208

LOCAL CONTACTS

Local decision-makers responsible for environmental quality:

CITY COUNCILMEN
Cities of Lynnwood, Edmonds and Mountlake Terrace

CITY PLANNING COMMISSIONS

SOUTH SNOHOMISH CHAMBER OF COMMERCE

How do present and future business needs affect planning for a quality environment? Will there have to be changes in business activity in order to solve environmental problems?

SNOHOMISH COUNTY PLANNING DEPARTMENT

What are comprehensive land use plans? How closely are these followed? Who is responsible to see that land use plans are complied with?

SNOHOMISH COUNTY PLANNING COMMISSION

How are Planning Commission members selected? What is their responsibility? How does their work relate to that of the Snohomish County Planning Department? Why is there a Planning Commission and not just a Planning Department? Why are there rezones and other exceptions to land use plans? How are these exceptions obtained?

SNOHOMISH COUNTY HEALTH DEPARTMENT

Environmental Health Division

What does the department have to do with problems of sewage disposal, water supplies (Spada Lake), food establishments, schools, tourist facilities, rodent and insect control, swimming pool and bathing beaches, refuse disposal?

SNOHOMISH COUNTY ENGINEER

What is the role of the County Engineer in making decisions on roads, transportation and other capital improvements in Snohomish County?

CITY DEPARTMENTS OF CITIES OF LYNNWOOD, EDMONDS AND MOUNTLAKE TERRACE

Building Department - What is the purpose of building codes? How are codes enforced? Are there exceptions? Why? How are decisions on exceptions made? What about conflicts between creating and enforcing of codes on the one hand, and protecting property rights on the other? Are there basic principles for resolving such conflicts?

Planning Department - What is the current city comprehensive plan? Where should businesses go? Apartments? Other multiple residences? What about lot sizes, etc.? What power does the Planning Department have? How are exceptions to the comprehensive plan decided? How does a city comprehensive plan relate to the county comprehensive plan? Is there some relating of local to regional planning?

Recreation and Parks Department

SNOHOMISH COUNTY ECONOMIC DEVELOPMENT COUNCIL
This organization is comprised of business and other organizations representatives to study and suggest to local land use decision-makers how area-wide comprehensive planning could take place for economic development of areas like Snohomish Valley.

Contact: Mr. Lloyd Repman, Chairman (Al 2-6236)
Monte Cristo Hotel
Everett, Washington

CITY OF EDMONDS
250 5th West
Edmonds, Wash. 98020
City Engineer, Planning Department, Recreation and Parks, Police Department, Water Department (200 Dayton, Edmonds, Wash. 98020)

ALDERWOOD WATER DISTRICT
City Center
Alderwood Manor, Washington 98036

CITY OF BRIER
City Hall
23303 Brier Rd.
Brier, Washington 98036

CITY OF LYNNWOOD
19100 44th Ave. West
Lynnwood, Washington 98036

CITY OF MOUNTLAKE TERRACE
Mountlake Terrace, Washington 98043

TOWN OF WOODWAY
11422 238th S.W.
Edmonds, Washington 98020

LYNNDALE GARDEN CLUB

LOUISE MARSHALL
16812 36th Ave. West
Lynnwood, Washington 98036
Author and editor of environmental and recreational materials.

SOUTH SNOHOMISH COUNTY COUNCIL ON HUMAN RELATIONS

PORT OF EDMONDS
456 Admiral Way
Edmonds, Washington 98020

SOUTH COUNTY SENIOR CITIZENS CENTER, INC.
220 Railroad Avenue
Edmonds, Washington 98020

MARIAN KOHN
1023 241st Place S.W.
Edmonds, Washington 98020
Parent and Research Associate, Zoology Department, University of Washington.

SNOHOMISH COUNTY HEALTH DEPARTMENT
South County Office
19701 Scriber Lake Road
Lynnwood, Washington 98036

SNOHOMISH COUNTY PARKS DEPARTMENT
Everett Courthouse (259-9317)
Everett, Washington

SNOHOMISH COUNTY PLANNING DEPARTMENT
Everett Courthouse (259-9311)
Everett, Washington

SUPERINTENDENT OF SCHOOLS
ISD 109
Everett Courthouse (259-0621)
Everett, Washington

SNOHOMISH COUNTY P.U.D. #1
21018 Highway 99
Lynnwood, Washington 98036

BOY SCOUTS OF AMERICA
Evergreen Council, Inc.
1615 1/2 Hewitt Avenue
Everett, Washington

SNOHOMISH COUNTY ENVIRONMENTAL COUNCIL

ADDRESSES FOR AGENCIES LISTED IN THE FILM LISTS

Aetna

Aetna Life & Casuality
Audio Visual Services
151 Farmington Ave.
Hartford, Conn. 06115

A -S

Association-Sterling Films
866 3rd Ave.
New York, N.Y. 10022

Common

Commonwealth Film Distributors
1440 S. State College Blvd.
Bldg 6-K
Anaheim, Calif. 92806

EBEC

Encyclopedia Brittanica Educational Corp.
425 N. Michigan Ave.
Chicago, Ill. 60611

Ethyl

Ethyl Corp.
Corporate Public Relations Dept.
330 S. 4th St.
Richmond, Va. 23219

FAA

Federal Aviation Administration
Film Library AC-44.5
P.O. Box 25082
Oklahaoma City, Oklahoma 73125

GASP

Group Against Smog And Pollution
P.O. Box 2850
Pittsburg, Pa. 15230

JF

Journal Films, Inc.
909 W. Diversey Pkwy
Chicago, Ill. 60614

Motor

Motor Vehicle Mfg Assn, Inc.
320 New Center Bldg
Detroit, Mich. 48202

MTPS

Modern Talking Picture Service
2323 New Hyde Park Rd.
New Hyde Park, N.Y. 11040

MUE

Media For Urban Environment
75 Frost St.
Brooklyn, N.Y.

NAC

General Services Admin.
National Archives And Records Service
National Audiovisual Center
Washington, D.C. 20409

NBC

NBC Educational Enterprises
30 Rockefeller Center
New York, N.Y. 10020

NFBC

National Film Board of Canada
680 5th Avenue
New York, N.Y. 10019

Shell

Shell Film Library
450 N. Meridian St.
Indianapolis, Ind. 46204

LESSON OUTLINE

TOPIC: _____
LEVEL: _____
EST.TIME: _____
SUBJECTS: _____

I. LEVEL V OBJECTIVE

II. LEVEL VI OBJECTIVE

III. TEACHER BACKGROUND INFORMATION

IV. MATERIALS NEEDED

V. ACTIVITY

A. PRE-ACTIVITY _____ Time: _____

B. ACTIVITY _____ Time: _____

C. POST-ACTIVITY _____ Time: _____

VI. RESOURCES

VII. SUGGESTED ADDITIONAL ACTIVITIES